

A 281.9

Ag8A

5

CZ



United States  
Department of  
Agriculture

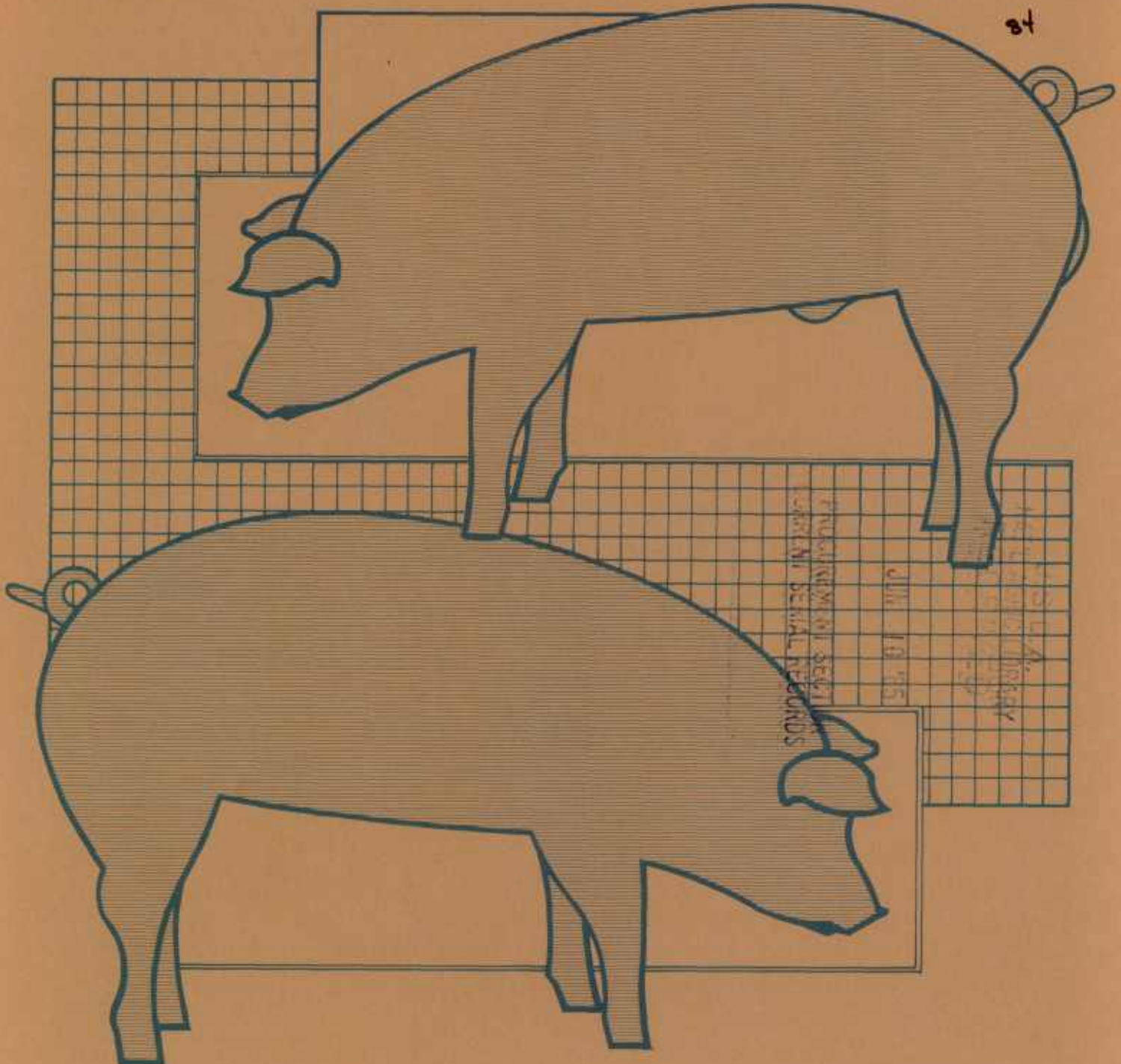
Economic  
Research  
Service

Agricultural  
Economic  
Report  
Number 511

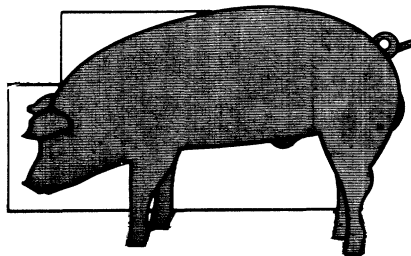
# U.S. Hog Industry

Roy N. Van Arsdall

Kenneth E. Nelson



## **Additional Copies of This Report . . .**



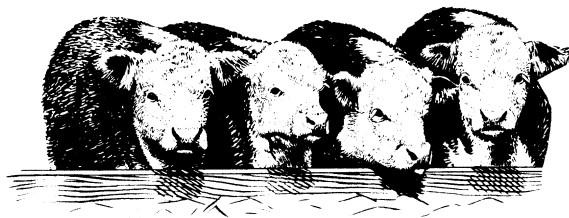
Can be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Ask for *U.S. Hog Industry* (AER-511). Write to the above address for price information or call GPO's order desk at (202) 783-3238. You can also charge your purchase by telephone to your VISA, MasterCard, or GPO deposit account. Bulk discounts are available.

This report is part of a project by the National Economics Division (Economic Research Service, USDA) to identify the structural characteristics, operating practices, and costs of production for the major meat animal industries in the United States. Reports published so far from the project include:



—*The U.S. Poultry Industry: Changing Economics and Structure*, by Floyd A. Lasley. \$3.25 from GPO at address above. Ask for stock number 001-000-04342-1.

—*Characteristics of Farmer Cattle Feeding*, by Roy N. Van Arsdall and Kenneth E. Nelson. \$3.75 from GPO at address above. Ask for stock number 001-000-04361-7.



Microfiche copies (\$4.50 for each report) can be purchased from the National Technical Information Service, Identification Section, 5285 Port Royal Road, Springfield, Va. 22161. Enclose check or money order, payable to NTIS. For additional information, call NTIS at (703) 487-4780.

The Economic Research Service has no copies for free mailing.

**U.S. Hog Production Industry**, by Roy N. Van Arsdall and Kenneth E. Nelson. National Economics Division, Economic Research Service, U.S. Department of Agriculture. Agricultural Economic Report No. 511.

## **Abstract**

There were 78 percent fewer hog farmers in 1978 than in 1950 but they produced about as much pork, and were located in the same regions of the country. The hog industry has moved rapidly to fewer and larger operations that draw on more capital-intensive technologies, like special housing with automated cleaning and feeding equipment. Differences are found in the characteristics and technical input/output ratios of smaller vs. larger operations, with apparent advantages for large operations in many important areas. These findings are based on a 1981 survey of hog producers.

**Keywords:** Hog, Feeder pig production, Hog finishing, Hog facilities, Structure of hog production.

## **Acknowledgments**

The authors thank Richard J. Crom, Terry L. Crawford, Henry C. Gilliam, Ronald D. Krenz, and Timothy C. Ulrich for their important contributions to this report.

# Contents

Page		Page	
iii	<b>Summary</b>	34	<b>Feedstuffs and Feeding</b>
iv	<b>Definitions</b>	34	High-Energy Feeds
1	<b>Introduction</b>	35	High-Protein Feeds
2	<b>Hog Production in Perspective</b>	36	Feed Processing and Distributing
5	Number and Size of Operations	38	Use of Pastures
7	Types of Hog Enterprises	40	<b>Production Facilities</b>
8	Hog Production, 1975-80	40	Farrowing Facilities
12	<b>General Farm Characteristics</b>	44	Pig Nurseries
12	Land in Farms	45	Growing-Finishing Buildings
14	Change in Land Farmed	46	Housing for Breeding Hogs
14	Land Use	48	Miscellaneous Facilities
15	Sales of Hogs	49	<b>Waste Management</b>
17	Other Livestock Enterprises	51	Bedding
18	Income Sources	52	Manure-Handling Equipment and Facilities
20	Tenure of Farm Operator	54	Pollution Control
20	Organization of the Farm Business	55	<b>Marketing Hogs and Pigs</b>
22	<b>Breeding Hogs</b>	55	Feeder Pig Marketing
24	<b>Measures of Performance</b>	56	Slaughter Hog Marketing
24	Performance of Hogs	58	International Trade
29	Seasonality of Production	59	<b>References</b>
29	Housing	60	<b>Appendix Tables</b>
30	Labor and Management		
32	Power and Energy		

## Summary

U.S. hog production, like most other parts of American agriculture, is becoming dominated by ever larger operations. Between 1950 and 1980, the number of U.S. hog farmers declined by nearly 80 percent from the peak of more than 2 million, while average sales per farm rose from 31 to nearly 200 head. About 40 percent of all hogs in 1980 were produced in operations selling 1,000 or more head (accounting for 3 percent of total U.S. hog farms). In 1964, by contrast, only 7 percent of total hog sales came from such large operations.

Despite sharply fewer producers, U.S. hog production stayed about the same in 1950-80. National consumption of pork per person trended downward during this period, but greatly reduced use of lard accounted for most of the drop. Pork represented about a third of U.S. red meat consumption in 1980, down from about half in 1950. That decline, however, was due more to a rise in beef consumption than a decline for pork.

Those are some of the findings in this report, which is based on a 1981 survey of 1,264 hog producers in the 18 major hog-producing States.

Large operations had clear and substantial advantages over smaller operations, pointing that the shift to larger operations will probably continue. They enjoy several important advantages:

*More production per sow*—The largest operations were able to wean nearly eight pigs per litter compared with seven or fewer for the smallest operations. They also got their sows back into production more quickly for another litter by weaning pigs at less than 4 weeks of age compared with nearly 7 weeks in the smallest operations.

*More intensive use of facilities*—Large operations produced hogs intensively year-round. Their production per unit of housing, which accounts for most of the investment required in hog production, was up to six times greater than on farms with the smallest enterprises. They also used machinery and equipment intensively.

*Less labor and power*—Large operations used only about a fourth the labor and far less power per unit of production.

*Lower feed costs*—Large operations had only a small advantage over small ones in amount of feed used per unit of production. They extended their advantage in feed costs, however, by turning for protein increasingly to soybean meal which can be bought directly from processors at wholesale prices.

*More effective marketing*—Large producers sold more of their feeder pigs direct to finishers and more of their slaughter hogs direct to packers, thus avoiding many of the marketing costs paid by small producers who made less use of direct selling.

They also chose to let packers value a much larger part of their slaughter hogs according to grade and yield (rather than price on a live weight basis) which indicates their confidence in having high-quality slaughter hogs.

While about 95 percent of all hog farmers run their businesses as sole proprietorships or general partnerships, many of the very large hog farms (annual sales of 5,000 head or more) are organized as some type of corporation or cooperative. More than 60 percent of the large North Central feeder pig producers, for example, are corporations (mostly nonfamily), and more than 30 percent are cooperatives. In contrast, most incorporated large operations that produce slaughter hogs are family controlled.

Most hog production features various degrees of confinement, although few operations keep their hogs totally indoors. Most confinement buildings are equipped with some type of slotted flooring, scrape, or flush systems to remove the wastes. Specialized buildings now in widespread use include:

*Central farrowing houses*—for sows to give birth and to care for their young until they are weaned.

*Pig nurseries*—to ease the transition from weaning to the growing-finishing stage.

*Growing-finishing houses*—where the pigs are raised to slaughter weight (about 220-230 pounds).

Hogs and pigs are raised for the most part in three types of specialized enterprises, outlined below. Although there is some overlap among the enterprises in some operations, most producers use only one production system. Production of slaughter hogs takes 10-12 percent longer in split-phase operations (feeder pig producers/feeder pig finishers) than in farrow-to-finish operations.

*Farrow-to-finish* enterprises account for about three-fourths of all slaughter hogs. In this type of enterprise the hogs are raised from birth to slaughter weight, which typically takes an average of 176 days.

*Feeder pig producers* raise pigs from birth to 40-60 pounds and then sell them to feeder pig finishers for additional fattening to slaughter weight, which typically takes an average of 66 days. This kind of operation is more prominent in the Southeast than in the North Central region.

*Feeder pig finishers* account for about a fourth of all slaughter hogs. In this type of enterprise, feeder pigs are purchased from feeder pig producers and raised to slaughter weight, which typically takes an average of 128 days.

## Definitions

**Auction market:** a market facility that receives livestock from the seller and for a fee sells to buyers on an auction basis open to the public.

**Barrow:** male castrated when young.

**Boar:** an uncastrated (sexually intact) male hog.

**Capacity of housing:** the maximum recommended number of animals to be kept in a building at one time.

**Central farrowing house:** a nonportable farrowing house with individual spaces for the females.

**Commercial slaughter:** includes all hogs slaughtered except those slaughtered on farms.

**Commercial supplement:** a high-protein feedstuff manufactured or formulated by a feed company.

**Complete feed:** a blend of feed ingredients providing all nutrients required by the hog.

**Confinement production system:** hogs are produced in nonportable buildings with or without access to lot space, but pasture is used only for breeding animals, if at all.

**Cull breeding animal:** male or female removed from the breeding herd generally for sale for slaughter.

**Custom feed processing:** grinding and mixing of ration ingredients for a fee at a commercial feed mill or by a mobile operator at the farm.

**Diversion terrace:** an earthen terrace designed to prevent precipitation runoff from crossing hog lots and becoming contaminated with wastes.

**Farrow:** give birth to pigs.

**Farrow-to-finish enterprise:** pigs are produced and fed to slaughter weight on the same farm.

**Feed conversion rate (feed efficiency):** a ratio indicating the units of feed used to produce one unit of hogs.

**Feeder pig enterprise:** pigs are produced for sale as feeder animals and typically sold weighing 40-60 pounds per head.

**Feeder pig finishing enterprise:** feeder pigs are purchased and fed to slaughter weight.

**Flush gutter:** gutter in the floor of a hog house through which manure is flushed with water periodically into a storage or disposal facility. Gutters may be open or under a slotted cover.

**General partnership:** a business organized as a partnership in which partners share in profits and losses.

**Gilt:** a young female hog that has not farrowed.

**Grade and yield (weight):** a method of determining value of a slaughter animal based on quality and weight of the dressed carcass rather than live weight of the animal.

**Gravity-drain gutter:** gutter under a slotted floor with capacity for holding manure accumulated for 3-7 days after which it is drained by gravity into a manure storage tank.

**Growing-finishing house:** a shelter building to house pigs while growing from 40-70 pounds per head to slaughter weight (220-240 pounds).

**High-moisture grain:** grain containing enough moisture (usually 22-30 percent) to require the addition of preservatives or fermentation in a silo for storage.

**Hog:** see pig (hog).

**Hog-corn price ratio:** the number of bushels of corn equal in value to 100 pounds of slaughter hogs on a live weight basis.

**Hog cycle:** the general industrywide movement in production of hogs from one peak (or low) of total supply to the next, historically averaging about 4 years due largely to biological lags in production adjustments, but increasingly affected by time needed to plan, finance, construct, and activate production facilities.

**Limited partnership:** a business organized as a partnership in which one or more partners have limited liability and do not participate in management.

**Liquid wastes:** manure and other residues from hog production containing enough water to require handling as a liquid.

**Manure lagoon:** a treatment structure for livestock wastes; can be aerobic, anaerobic, or facultative depending on loading and design.

**Market or slaughter hogs:** barrows and gilts finished for the slaughter market usually weighing 220-240 pounds per head.

**Mixing concentrate (pre-mix):** a mix of the ingredients necessary to provide nutrients essential for hogs that is added to corn and soybean meal to make a complete ration.

**Nursery:** a building shelter for pigs from weaning to weights of 60-70 pounds per head.

**Order buyer:** an agent who purchases livestock for a fee according to specifications of the purchaser.

**Pasture production system:** hogs are produced on pasture with portable facilities.

**Pig (hog):** the name "pig" is applied to domesticated swine of all ages and sizes in most countries of the world except the United States where "pig" commonly means the younger animals, typically those weighing less than 100 pounds, while "hog" refers to all larger animals.

**Portable housings:** shelters that can be moved from one location to another by tractors.

**Scrape gutter:** gutter in the floor of a hog house through which manure is mechanically scraped periodically into a storage or disposal facility. Gutters may be open or under a slotted cover.

**Settling basin:** a basin designed to settle out and retain most of the solid materials in runoff from a hog lot before it passes to a manure lagoon or vegetative filter. The solids must be removed periodically.

**Slotted floor:** floor of building made of perforated material or slats spaced to allow manure to drop into pits or gutters below the floor. Floors may be partly or totally slotted.

**Soil injection of wastes:** injection of liquid wastes below the surface of the soil.

**Solid wastes:** manure and other residues from hog production containing insufficient water to be handled as a liquid.

**Sow:** an adult female hog that has farrowed at least once.

**Split-phase hog production:** production and finishing of pigs is in separate operations instead of combined in the same operation as in farrow-to-finish enterprises.

**Stag:** a male hog castrated after reaching sexual maturity.

**Standard "C" family corporation:** a separately taxed entity in which equity ownership is represented by stock held by family members, and management is centralized and controlled by a board of directors.

**Subchapter "S" family corporation:** similar to a "C" corporation, except generally not separately taxed and subject to certain restrictions to maintain subchapter "S" status. It is taxed like a partnership.

**Tel-auction market:** pigs are weighed and graded either at an assembly point or on the farm and are then auctioned by description via remote contact with buyers.

**Terminal market:** a market facility, generally located in or near a metropolitan area, which receives livestock from sellers and sells them to packers through commission firms that represent the sellers for a fee.

**Total confinement:** hogs are kept within buildings during all stages of production.

**Vegetative filter:** an area of close growing crops downslope from a hog lot designed to absorb pollutants in runoff after it has first moved through a settling basin to remove the solid materials.

**Waste management:** the utilization or disposal of manure, used bedding, and waste water resulting from hog production.

# U.S. Hog Production Industry

Roy N. Van Arsdall and Kenneth E. Nelson\*

## Introduction

The U.S. hog industry has been turning out about the same amount of pork for many years. Otherwise, the industry now bears little resemblance to that of 30 years ago, when over 2 million farmers produced hogs in small enterprises, all managed about alike. Now there is a mix of small and large operations with old and new ways of producing hogs. Change has been especially rapid in recent years. Fewer and larger operations draw more heavily on capital intensive technologies in the production of hogs. Greater specialization has altered the economic relationships and patterns of supply response in hog production. Economies of size are becoming increasingly important in determining costs and returns.

The changing makeup of the hog industry, how it operates, what resources it uses, and who produces hogs and controls production carry impacts far beyond the producers involved. Changes in the way hogs are produced affect the input and supply industries; marketing, processing, and distribution firms; and the issues with which public policymakers must deal.

This report provides detailed information on current hog production, including the makeup of farms with different types and sizes of hog enterprises, the kinds and amounts of resources used in hog production, and the production and marketing practices employed. Such an examination provides a basis for measuring recent changes in hog production and thereby aids in identifying trends and future change. It also provides a basis for estimating costs of production and efficiencies in the use of major resources.

The data come largely from a 1981 survey of hog producers conducted by USDA's Statistical Reporting Service (SRS) working jointly with the Economic Research Service. The survey collected information on the makeup of farms with hog production enterprises, the practices and facilities involved in hog production, and the costs of hog production for which estimates are not available from other sources. All data from the survey apply to calendar year 1980 unless otherwise specified. Data for

other years come from other sources as noted. Frequent comparisons are made with the results of a similar study of the hog industry conducted in 1976 (19).<sup>1</sup>

The 1981 survey collected information from 1,264 farms with sales of 2.9 million hogs and pigs in 1980. Those hog farms were located in 18 States where over 90 percent of all U.S. hogs and pigs are produced (fig. 1). These States were grouped into two regions having substantially different agricultural characteristics—11 States in the North Central region and 7 States in the Southeast.<sup>2</sup>

In the survey, farms were classified according to the type of hog enterprise that they operated in 1980 (based on SRS information). They were then selected for the sample on a random basis from populations stratified according to size of hog enterprise. Weights were assigned to each farm based on its probability for selection in the sample, and to the enterprise size-type classes to assure that the results would be representative of the hog industry.

Farms had to meet certain qualifications before they were included in the sample to represent commercial hog production. Farms had to have one of the three basic types of commercial hog enterprises: feeder pig production, farrow-to-finish, or feeder pig finishing. Sales had to be at least 100 head of hogs and pigs during 1980, with at least 75 percent coming from the identified enterprise. Farmers that started or ceased hog production during the year were excluded.

A few farmers typically engage in more than one type of hog production or switch from one type of enterprise to another as economic relationships dictate. Such mixed operations are not common in the industry, however. Their omission from the study

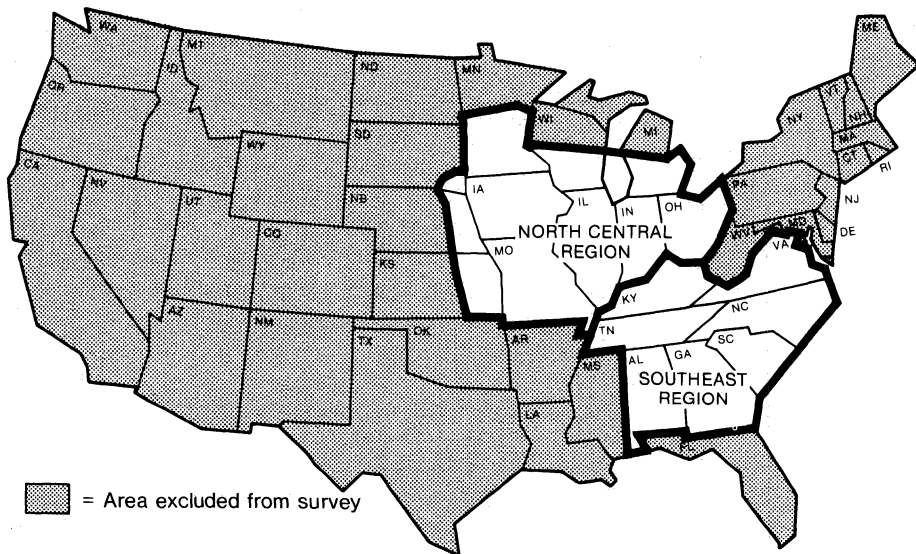
\*Agricultural economists in the Animal Products Branch, National Economics Division, Economic Research Service, U.S. Department of Agriculture, stationed at Urbana, Ill.

<sup>1</sup>Italicized numbers in parentheses cite references listed at the end of the report.

<sup>2</sup>The Southwest region, which was a part of the 1976 study, was excluded in the 1981 survey because its hog production had declined to only 2 percent of the U.S. total.

Figure 1

## U.S. Hog Production Regions



accounted for only about 6 percent of the potential respondents in the sample. Producers who were excluded from the sample because they went in or out of hog production during 1980 accounted for 4 percent of the potential respondents.

Excluding farms selling fewer than 100 hogs or pigs during 1980 was by far the most important constraint in terms of the number of producers qualifying for the sample. According to 1978 census data, 45 percent of all farms selling hogs or pigs in the North Central region and 77 percent of those in the Southeast region sold fewer than 100 head that year. Their sales, however, accounted for only 7 percent of total sales in the North Central region and 19 percent in the Southeast and have been a declining percentage of the total for many years.

The population of producers qualifying for the sample was divided into six classes based on annual sales of hogs and pigs: 100-199; 200-499; 500-999; 1,000-1,999; 2,000-4,999; and 5,000 or more. The population of each size-type class was sampled randomly, taking higher proportions of the total for larger enterprises, to obtain adequate observations for each situation.

The survey was designed specifically to get information not available from other sources on hog production and hog farms. To make this report as complete as possible, data from the Census of Agriculture, various SRS publications, and other secondary sources were used in addition to data from the survey. Analyses reported here are restricted largely to production practices and physical relationships. Estimates of costs and returns for hog production draw heavily upon these data and are published annually in (10, 12, 20).<sup>3</sup>

## Hog Production in Perspective

The hog industry, in its broad outlines, seems to have changed little between 1950 and 1960. Most hogs are still produced where corn is the major crop. Total volume of production has

<sup>3</sup>Budgets of costs and returns for hog production in different types and sizes of enterprises, and in different regions of the country, are produced annually by the National Economics Division's (ERS, USDA) Firm Enterprise Data System (FEDS) at Stillwater, Okla.



been steady. The hog cycle endures. But beyond these general observations, the hog industry has undergone major changes. The following data highlight some of the more important characteristics of the hog industry during the past 30 years to provide a setting for examining the detailed structural characteristics of the industry as it appeared in 1980.

In the early fifties, hogs accounted for over half of total U.S. red meat production, at around 13 billion pounds carcass weight. In the late seventies, hog production remained at about the same level, but pork had dropped to about a third of the red meat supply. Beef was the big gainer as the total red meat supply expanded by about 50 percent between 1950 and 1980 (app. table 1).

Hogs did not keep pace with most of the rest of U.S. agriculture over the last 30 years in generating cash receipts from farm marketings (fig. 2). Annual cash receipts from sales of hogs averaged \$3.5 billion during 1950-54, nearly \$8.8 billion during 1977-81 (11). This 2.5-fold increase in receipts is little different than inflation over the period, however. Cash receipts from all farm marketings increased fourfold due to a combination of increased volume of production and sales, especially for crops and beef cattle, and inflation. As a result, the share for hogs dropped from 11.3 percent of the total (20.1 percent of cash receipts from all livestock) in 1950-54 to 7.0 percent (14.1 percent of the amount from livestock) in 1977-81. Hogs had only 13.2 percent of the cash receipts from marketings of livestock and livestock products in 1979 and 1980 when production was at record levels. This was the lowest share for hogs in the 1946-81 period.

Consumption of pork per capita declined from 75-85 pounds to 60-70 pounds over these years, measured on a carcass basis. Use of pork meat, however, was relatively stable: most of the decline represented reduced consumption of lard, which dropped from nearly 14 pounds per capita in the early fifties to only about 2 pounds in the late seventies. This reflects a major shift in consumer preferences and the remarkable ability of hog producers to adjust rapidly to the production of meat-type hogs. The proportion of slaughter hogs that qualified for U.S. No. 1 or No. 2 grades (which reflect a high yield of meat) rose from 50 percent in 1968 to nearly 96 percent in 1980 (7).

Hogs are produced in every State, but mostly in or near the chief grain production regions (fig. 3). The Corn Belt-Lake States and Northern Plains (the North Central region of this study) accounted for 78 percent of total U.S. hog production both in 1950 and 1980 (table 1). Iowa and Illinois retained the number 1 and 2 positions throughout the period with well over a third of the total. States in the western part of the North Central region have been gaining a slightly increasing share of total hog production compared with States in the eastern part due to lower prices for grain and probably less concern with environmental pollution from production sites (app. table 2).

The Southeast accounted for nearly a sixth of total U.S. hog production in 1980, slightly more than in any previous period. This gain may be temporary, however. It came after several profitable years for hog producers and during a year of record total hog production. The costs of feed grains are least for producers in the North Central region, and increasing costs of transportation continue to widen the gap to the disadvantage of

Table 1—Distribution of hog production, by region<sup>1</sup>

Region	1950	1955	1960	1965	1970	1975	1980
<i>Percent of live weight<sup>2</sup></i>							
Corn Belt-Lake States:							
Eastern	30.2	31.1	32.5	31.7	28.6	29.2	25.4
Western	36.9	37.8	36.9	37.8	37.2	36.6	39.6
Northern Plains	10.4	11.1	10.2	12.1	13.7	12.8	13.0
Southeast	14.0	13.0	14.1	12.8	14.4	14.8	15.8
Southwest	3.5	2.6	2.3	2.0	2.6	2.4	2.0
Other	5.0	4.4	4.0	3.6	3.5	4.2	4.2
48-State total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

<sup>1</sup>The States in each region are as follows: Corn Belt-Lake States—Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, Wisconsin; Northern Plains—Kansas, Nebraska, North Dakota, South Dakota; Southeast—Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia; Southwest—New Mexico, Oklahoma, Texas; Other—rest of the 48 States. The Corn Belt-Lake States combined with the Northern Plains are essentially equivalent to the North Central region covered in this study. The Southeast region in this table covers a larger area than the Southeast region used elsewhere in this study.

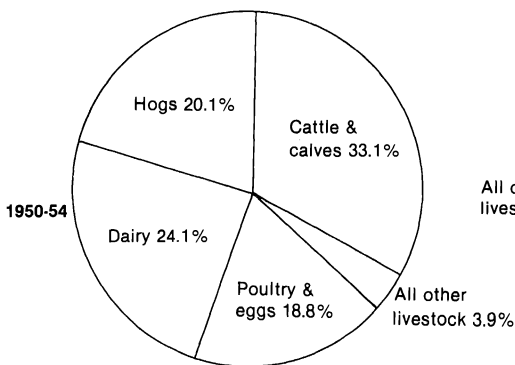
<sup>2</sup>Percentages are based on live weight produced. See appendix table 2 for data by States.

Source: (11).

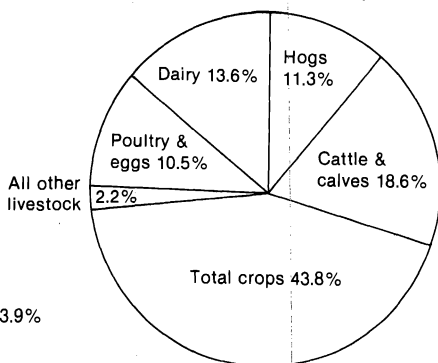
Figure 2

# Cash Receipts from Farm Marketings by Commodity, 1950-54 and 1977-81

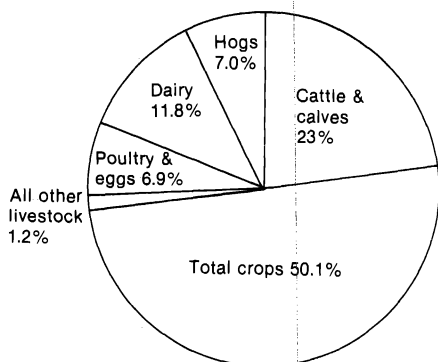
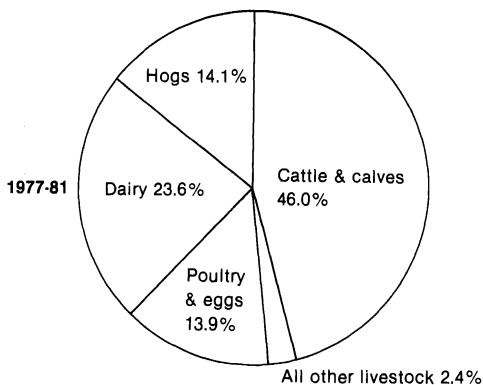
Livestock and livestock products



Crops, livestock, and livestock products

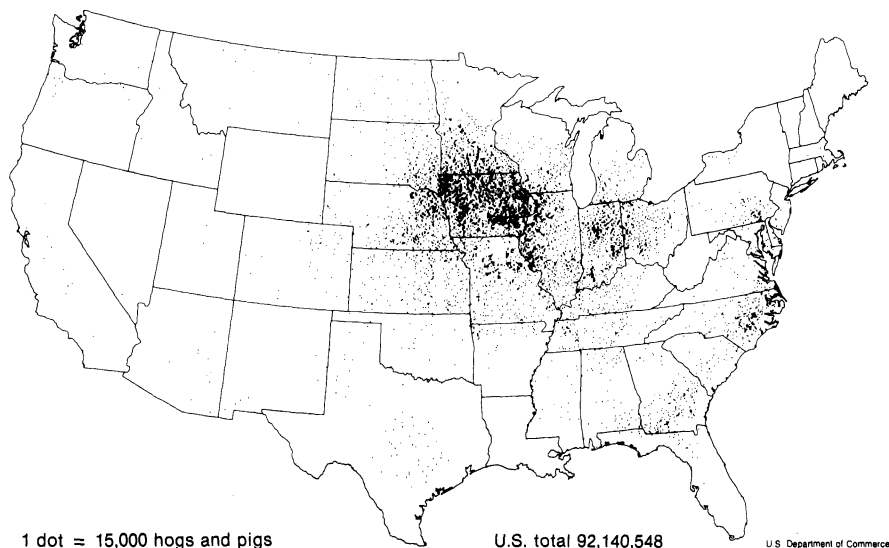


Total average annual cash receipts  
\$31.0 billion



Total average annual cash receipts  
\$124.7 billion

Figure 3

**Hogs and Pigs Sold: 1978**

producers in the Southeast. All other areas of the country had a small and declining part of total hog production in 1980.

**Number and Size of Operations**

In 1950, 2.1 million U.S. farmers sold hogs and pigs, with average sales of only 31 head per farm. According to the 1978 census, the number of farms selling hogs and pigs had dropped by 78 percent (to 470,500) since 1950, while average sales per farm rose nearly sixfold (196 head per farm). This rapid shift to fewer and larger operations, along with the associated changes in ways of producing hogs that brought it about, is probably the most important feature influencing the hog industry now, and it seems likely to remain a major factor in the future.

The increasing proportion of production from relatively large hog operations means more to industry structure and performance than does the rise in average production per farm. Few large hog operations existed in 1950. In 1964, only 7 percent of total sales came from farms selling 1,000 head or more annually. That

proportion doubled to 13 percent 5 years later, doubled again in the next 5 years to stand at 25 percent of total sales in 1974 (19), and stood at 33 percent in 1978 (tables 2 and 3). The Census Bureau, extending its size range in 1978 to identify sales from farms selling 5,000 head or more, reported more than 7 percent of total sales from such large operations—the same proportion that had come from all farms selling 1,000 head or more just 14 years earlier. Nationally, fewer than 16,000 producers (3.3 percent of the total) selling 1,000 head or more accounted for a third of total sales in 1978.

Changes in the size of hog operations have not been uniform throughout the country. Midsize operations (sales of 200 to 2,000 head annually) dominated production in the North Central region in 1978. Smaller enterprises played a continually declining role, but larger operations still accounted for only about 5 percent of total sales in most of these States (app. tables 3-6). Exceptions to this pattern were Kansas and Nebraska where 12 percent of sales came from operations selling 5,000 or more hogs. Both of these States have been increasing their share of

total hog production, and large-scale operations have been a characteristic of their agriculture generally, especially in cattle feeding.

The size distribution of hog production in the Southeast region in 1978 differed markedly from that in the North Central region. Farms with sales of fewer than 100 head of hogs accounted for nearly a fifth of total hog sales in the Southeast—nearly three times as high a proportion as from such small enterprises in the North Central region. Conversely, large operations were more important in several of the Southeast States, especially in North Carolina, where 28 percent of total sales came from operations selling 5,000 head or more.

Total hog production continued to increase between the census year of 1978 and the survey year of 1980, reaching a record commercial slaughter of over 96 million head that year. While there is no precise measurement of the size distribution of hog enterprises more recent than the 1978 Census of Agriculture, hog inventory data collected by SRS provide a guide to year-to-year changes in size of hog enterprises (17). Hog production increased from farms with all sizes of enterprises between 1978 and 1980, but production increased most rapidly on farms with the larger enterprises. Between these two years, the proportion of total inventory held by farms with 500 head or more (equivalent to annual sales of at least 1,000 head) increased from 38 to 44 percent of total inventory in the major hog-producing States,

Table 2—Hogs and pigs sold from all farms, by size of enterprise and region, 1978

Region <sup>1</sup>	Head sold	Annual sales (head) <sup>2</sup>							Total
		1 to 99	100 to 199	200 to 499	500 to 999	1,000 to 1,999	2,000 to 4,999	5,000 and over	
	<i>Thou</i>	<i>Percent of sales</i>							
All hogs and pigs:									
North Central	71,041.4	6.7	10.0	26.5	24.2	17.4	9.7	5.5	100
Southeast	12,361.0	18.2	11.4	15.7	16.6	11.9	11.2	15.0	100
U.S. total	92,140.5	9.6	10.4	24.5	21.8	16.3	10.2	7.2	100
Feeder pigs:									
North Central	14,643.7	7.8	10.5	25.5	21.7	.....	34.5 <sup>3</sup>	.....	100
Southeast	3,075.2	27.3	17.5	20.3	10.5	.....	24.4 <sup>3</sup>	.....	100
U.S. total	20,020.4	12.7	12.0	24.0	19.1	.....	32.2 <sup>3</sup>	.....	100

<sup>1</sup>The regions are those included in the 1981 survey of hog producers. Data for the included States appear in appendix tables 3 and 5. Sales are those from all farms.

<sup>2</sup>Size classes are those used by the Census Bureau.

<sup>3</sup>Census does not provide a breakdown of sales from farms selling 1,000 or more feeder pigs. We can say only that these pigs came from farms selling 1,000 or more feeder pigs.

Source: (18).

Table 3—Farms selling hogs and pigs by size of hog enterprise and region, 1978

Region <sup>1</sup>	Farms with sales	Annual sales (head) <sup>2</sup>							Total
		1 to 99	100 to 199	200 to 499	500 to 999	1,000 to 1,999	2,000 to 4,999	5,000 and over	
	<i>Thou</i>	<i>Percent of farms</i>							
All hogs and pigs:									
North Central	272.5	44.8	18.7	22.5	9.4	3.5	0.9	0.2	100
Southeast	102.2	80.8	9.1	5.7	2.8	1.0	.4	.2	100
U.S. total	470.5	59.8	14.8	15.7	6.4	2.4	.7	.2	100
Feeder pigs:									
North Central	76.2	43.8	19.7	22.6	9.3	.....	4.6 <sup>3</sup>	.....	100
Southeast	37.7	77.5	11.2	7.4	2.3	.....	1.6 <sup>3</sup>	.....	100
U.S. total	143.8	59.7	16.1	15.2	5.9	.....	3.1 <sup>3</sup>	.....	100

<sup>1</sup>The regions are those included in the 1981 survey of hog producers. Data for the included States appear in appendix tables 4 and 6. Sales are those from all farms.

<sup>2</sup>Size classes are those used by the Census Bureau.

<sup>3</sup>Census does not provide a breakdown of sales from farms selling 1,000 or more feeder pigs. We can say only that these pigs came from farms selling 1,000 or more feeder pigs.

Source: (18).

leaving farms with the smaller average inventories with lesser shares of the total (app. table 7). This reflects an even greater gain for the larger operations in terms of share of sales because their annual sales are typically at least twice their inventory while farms with small enterprises have annual sales of about the same as their inventory (app. table 8).

Farmers selling fewer than 100 head of hogs and pigs in 1980 were estimated to have declined to about 6 percent of sales in the North Central region and to about 17 percent in the Southeast. Those with sales of 1,000 head or more had reached 38 percent of total sales in the North Central region and 42 percent in the Southeast. When only farms with sales of 100 head or more are considered, which is one of the basic constraints of this study, the operations with sales of 1,000 head or more are estimated to have accounted for over 40 percent of sales in the North Central region and 50 percent in the Southeast. Farms selling 5,000 head or more accounted for 7 and 16 percent of the total in these two regions, respectively (table 4). Midsized enterprises continued to hold relatively strong positions, especially in the North Central region.

When the hog industry cut back in 1981 from the record-high production of 1980, producers with the larger enterprises had an even larger share of total production than in 1980. The share of the hog and pig inventory held by operators with inventories of 500 head or more at the end of 1981 was up by nearly 8 percent in the major hog-producing States, 26 percent in the secondary States (app. table 7). The share of inventory held by producers with 100-499 head dropped sharply while that held in the smallest enterprises continued its long-term decline. This is a repetition of the pattern of recent years during which larger operations have been increasing their shares in a continuous stepwise fashion, depending upon the profitability of hog production.

When hog production is profitable, expansion is general across operations of all sizes and in areas adjacent to those of intensive hog production. As economic conditions worsen, as they did in 1979-81, the larger producers tend to stabilize their production

while the smaller producers cut back or drop out, especially those in marginal areas of production.

Gains by the larger producers in share of total hog production are likely to continue in the future in the same fashion and at least as rapidly. They have a number of economic advantages and tend to remain in production during the good and bad years alike. Their economic position will be strengthened by the high returns realized from hog production throughout much of 1982. During periods of profit, further expansion is encouraged by Federal income tax regulations that provide for fast writeoff of investments in depreciable assets and investment credit for certain expenditures. Many farmers with smaller operations likely stayed in production only long enough to suffer the heavy losses of 1979-81.

### Types of Hog Enterprises

Basically, there are three types of hog enterprises:

- Feeder pig production in which farmers produce pigs and sell them to others for finishing.
- Farrow-to-finish operations in which all phases of the production of slaughter hogs are carried out in one operation.
- Feeder pig finishing where farmers buy feeder pigs and feed them to slaughter weight.

Some farmers operate mixed enterprises, but most maintain only one of these three types. Farrow-to-finish operations have always dominated total hog production. In the major hog-producing States of the North Central region, four out of every five slaughter hogs are produced in farrow-to-finish enterprises. Even in the less important hog-producing States in the North Central and Southeast regions at least two of every three slaughter hogs are produced in these enterprises (19). The remainder of slaughter hog production is from feeder pigs produced on one farm and sold to another to be finished for slaughter.

**Table 4—Estimated distribution of sales of hogs and pigs, and farms producing hogs and pigs, by size of hog enterprise and region, 1980<sup>1</sup>**

Region	Sales of hogs and pigs				Annual sales of hogs and pigs (head)					
	Total	Feeder pig production	Farrow-to-finish	Feeder pig finishing	100 to 199	200 to 499	500 to 999	1,000 to 1,999	2,000 to 4,999	5,000 and over
----- 1,000 head -----										
North Central	87,527	17,715	51,480	18,332	9.8	26.0	23.9	21.5	12.0	6.8
Southeast	14,090	3,732	7,243	3,115	14.1	20.7	14.9	16.7	17.1	16.5
----- 1,000 farms -----										
North Central	184.9	37.4	108.8	38.7	33.4	40.2	16.8	7.3	2.0	.3
Southeast	28.6	7.6	14.7	6.3	49.1	32.8	10.5	4.7	2.2	.7

<sup>1</sup>Based on a combination of data from (17, 18) and the 1981 survey. The percentage distribution for sales and farms selling hogs applies to all types of hog enterprises and are the values used to weight results of the survey by size of operation.

The farrow-to-finish setup, which embodies all phases of hog production in one operation (maintenance of a breeding herd through raising of pigs and finishing them for the slaughter market), offers a number of advantages over split-phase production, especially for farms in surplus grain-producing areas such as the North Central region. Producers control the number, quality, and timing of pigs they will finish. They avoid the costs of buying and transporting pigs, losses and stresses incurred during marketing and transportation, the possibility of diseases being introduced by pigs from another farm, and pigs of unknown performance characteristics. Performance of the animals may be better observed, measured and improved.

But there are also disadvantages. Farrow-to-finish production requires a more even balance of the major resources used in hog production—feed, labor, and capital—than do pig production and finishing when conducted on separate farms. Labor is a relatively more important input in pig production; feed cost in pig finishing. Thus farmers, even in one geographic area, may correctly choose different types of hog enterprises because the kinds and costs of resources available to them are better suited to one type of enterprise than to others.

In both 1969 and 1974, sales of feeder pigs accounted for only 16 percent of the total sales of all hogs and pigs in the United States (19). The proportion increased to 21 percent in 1978, but this does not necessarily imply that pig production as a separate operation is trending upward, because strong expansion in total numbers of hogs was underway in 1978 (app. tables 3 and 5).

Feeder pig production is relatively more important in the Southeast than in the North Central region. It is of major importance in some States adjacent to those where grain and hog production is concentrated (app. table 5). For example, feeder pigs accounted for 35 percent of total sales of all hogs and pigs in Wisconsin in 1978, and 38 percent in Tennessee, compared with only 18 percent in Iowa. States with a large hog production, however, also produce most of the supply of feeder pigs. Iowa, for example, while seldom identified as a feeder pig producing State, recorded sales of 3.9 million head of feeder pigs in 1978—nearly 2 million head more than any other State and nearly six times the total sales of feeder pigs in Tennessee.

Feeder pig producers experience wide swings in the prices they receive for pigs. When costs and market prices are favorable for the production of slaughter hogs, feeder pigs are much in demand and they bring high prices. When there is little or no profitability in the finishing of hogs, the prices paid for feeder pigs drop drastically. Prices received for pigs may differ by a factor of five or more between the highs and lows occurring during a hog cycle. As long as most feeder pigs are sold outright by producers to finishers, as is now the common practice, the high degree of price risk often aggravated by unknown quality of pigs makes it unlikely that separate production of feeder pigs will increase significantly.

## Hog Production, 1975-80

The surveys for 1975 and 1980 provide benchmark measurements of the industry.<sup>4</sup> Ideally, benchmark measurements of any industry should be made during normal years or during years when economic conditions were essentially the same. In reality, however, the only thing normal for the hog industry is continuous change and adjustment. Cyclical movements in production, prices, and returns prevail. Extended periods of stability are rare.

The shifting structure of the hog industry, uncertain actions of producers of competitive meats, changing costs of inputs, and fluctuations in the general economy prevent accurate long-range prediction even of cyclical movements in hog production. Benchmark measurements must be planned far in advance of the actual collection of data from producers. The prevailing economic conditions must therefore be accepted as they are with due recognition given to producer actions dictated by such circumstances.

## Profitability of Hog Production

The economic situation for recent years described here will help explain the circumstances to which producers were reacting and the extent to which industry characteristics may have been affected. In general, hog production in 1975 was low and profitability was moving upward; in 1980, hog production was at a record high, 40 percent above 1975, and returns were exceptionally low. Hence, the two survey years in which industry benchmark measurements were made were near opposites from the standpoint of production and profitability.

Commercial slaughter of hogs in 1974 was nearly 82 million head, corn cost more than \$1 per bushel above the price in 1973, and the hog-corn ratio averaged about 12, the lowest since the mid-1950's (fig. 4).<sup>5</sup> The ensuing low returns to hog production in 1974 led to herd liquidation and sharply reduced production in 1975. Commercial slaughter of hogs dropped below 69 million head that year, the lowest level since 1967. As a result, prices for hogs increased sharply. Corn was less costly than in the previous year resulting in a rapidly increasing hog-corn price ratio averaging near 17 for the year. Producers responded accordingly. Thus, during the 1975 benchmark year, hog producers were operating at a relatively low level of facility use, but were beginning to expand.

<sup>4</sup>Major changes in the U.S. hog industry since 1950 are described in (8).

<sup>5</sup>The hog-corn price ratio indicates the number of bushels of corn equivalent in value to 100 pounds of slaughter hogs. It is a less precise indicator of the profitability of hog production now than in years past when corn was a higher proportion of the cost of producing hogs, but it still provides a general indication of relative profitability.

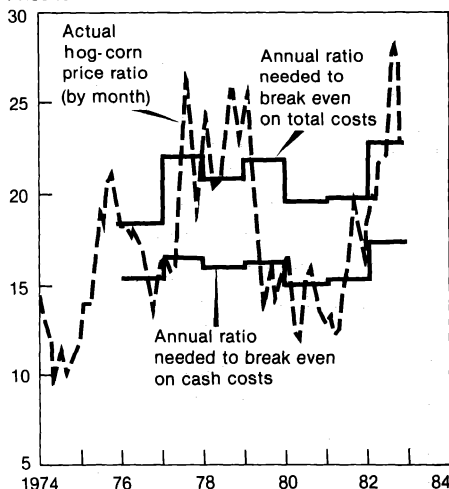
Hog production continued to expand during 1976-78, but the rate of increase was quite low in spite of a moderating corn price, which pushed the hog-corn price ratio to an average of 20 or above in both 1977 and 1978. This was a most encouraging economic situation for hog producers. They generally misinterpreted the slow growth in production, however, as a lack of response to profitable conditions and were thus further encouraged to expand. Actually, heavy expansion was underway during this period. It simply could not occur as quickly as in years past when many producers largely controlled supply by each breeding more or fewer sows. The major part of the expansion in process was in the form of sizable increments, even whole new enterprises, in mid- to large-size operations. Two or three years were needed to plan, finance, build, staff, and put these new units into production—a situation not encountered previously.

Prior to 1970 the hog cycle, as shown by year-to-year changes in the number of pigs produced, averaged about 4 years (fig. 5).

Figure 4

### Hog-Corn Price Ratios — Actual and Needed to Break Even

Price ratio



Note: Estimates of cash and total costs unavailable prior to 1976.  
Actual hog-corn price ratio is Omaha basis.  
Break-even hog-corn price ratios are for average U.S. farrow-to-finish producer.

During the 1970's reductions in total production took longer and went lower than previously, partly because of resistance to cuts by larger producers for whom fixed costs were a greater part of total costs of production than for small producers who dominated the industry in earlier years.

By 1979, most of the new production capacity was in use. Commercial slaughter of hogs that year rose above 89 million head. The hog-corn price ratio averaged about 18 for the year, but plunged during the latter part of the year due to sharply lower prices for hogs and higher prices for corn.

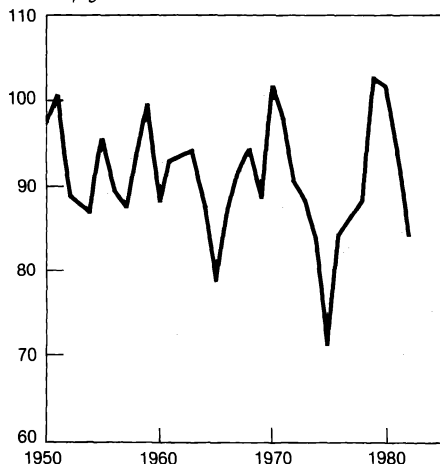
Despite the sharply reduced returns for hog production in 1979, so many hogs were already on farms that commercial slaughter in 1980, the year chosen for the second benchmark survey, exceeded 96 million head, a new record. Prices for slaughter hogs continued to drop as a result, falling below \$30 per hundredweight during the spring of 1980. Corn prices rose sharply in the latter part of 1980 as a result of the widespread drought, which cut supplies. The hog-corn price ratio averaged little better than 14 for the year.

Thus 1980, the second benchmark year and the focus of this study, found hog producers in their second consecutive year of losses. The average U.S. farrow-to-finish hog producer incurred

Figure 5

### U.S. Pig Crop

Million pigs



Source: (11)

cash losses for the year as a whole and for most of the months during the year (fig. 4). Returns stayed far below total longrun costs.

High versus low hog production, poor versus good returns, contraction versus expansion of output: such were the opposing characteristics of the two base periods of 1980 and 1975 that resulted in some differences in producer actions measured by the surveys. There are expected differences in intensity of facility use, rates of culling and replacement, purchases of breeding stock, and perhaps even shifts in type of hog enterprise. Yet, most basic aspects of the farms on which hogs are produced—the enterprise combinations, types of facilities, organization, and operation of the hog enterprises—are relatively unaffected in the short run by the phase of the hog cycle or returns to hog production. Therefore, the low returns and production adjustments of 1980 had little or no effect on the results of most parts of the current study. Relationships that were influenced by the economic characteristics of 1980 are clearly pointed out in the ensuing discussion.

#### Nature of 1975-80 Expansion

Historically, changes in total hog production have been made rather quickly by large numbers of farmers making relatively small changes in the number of sows bred. Gradually over the past 30 years, substantial numbers of farmers quit producing hogs permanently when returns were low; the remaining producers enlarged their operations as returns improved. During recent years, adjustments involved far fewer producers using, for the most part, production facilities requiring large investments of capital.

The production years 1975 and 1980, while posing some disadvantages for measurements of the changes in hog industry characteristics over time, allow detailed examination of producer actions during a period of major expansion in production with capital intensive systems of production in use. Hog production rose from a cyclical low of less than 69 million head for commercial slaughter in 1975 to a cyclical high of over 96 million head in 1980—an increase of 40 percent.

Roughly half of the increase in hog production between 1975 and 1980 came from farms that produced hogs in both years. Overall, sales of hogs and pigs from these farms were 23 percent greater in 1980 than in 1975 (table 5). The average increase per farm was similar for all types of hog enterprise and region of production. Expansion in production between 1975 and 1980 did not result from all farmers acting the same, however: nearly half of all producers produced roughly the same number of hogs in 1980 as in 1975; about a fifth more than doubled production over the 5 years; and about a tenth cut production by more than half. The rest either increased or reduced production, but to a less extreme degree (table 5).

Adjustments in production over this period were closely related to differences in size of hog enterprises. Typically, producers with smaller hog enterprises in 1980 produced the same or less than in 1975 (app. table 9). A high proportion of the larger enterprises had increased output substantially, commonly by 50-100 percent or more.

Farmers who began producing hogs sometime after 1975 accounted for about the same proportion of the large increase in production between 1975 and 1980 as producers who expanded hog production over the period. Some were active farm-

Table 5—Size of hog production enterprise in 1980 compared with 1975, by type of hog enterprise and region<sup>1</sup>

Enterprise and region	Sales in 1980 compared with sales 1975	Sales of hogs and pigs in 1980 compared with 1975				
		Same (76-125 percent)	Larger (126-200 percent)	Much larger (over 200 percent)	Smaller (50-75 percent)	Much smaller (less than 50 percent)
Percent		Percent of farms				
Feeder pig production:						
North Central	124	65	8	15	2	10
Southeast	116	33	13	37	12	5
Both regions	123	58	9	20	4	9
Farrow-to-finish:						
North Central	121	39	17	19	14	11
Southeast	120	49	16	15	12	8
Both regions	121	40	17	19	13	11
Feeder pig finishing:						
North Central	132	48	25	22	1	4
Southeast	112	48	13	24	11	4
Both regions	129	48	23	23	2	4
All farms	123	44	17	20	10	9

<sup>1</sup>Includes only farms with sales of hogs and pigs in both 1975 and 1980.



ers in 1975, but produced no hogs; some were not even farming that year. These new entrants contributed substantially to sales from all types of hog enterprises, but they added most to feeder pig production and finishing (table 6).

New entrants getting started after 1975 were doubtless encouraged by the slow buildup in total production and the relatively long period of good returns, misjudging the much longer time needed to expand production capacity as a lack of production response. This situation appears unique in the history of industry adjustments, but the requirements and resulting lags in the installation of modern production systems suggest that the same conditions are likely to recur in the future.

Farmers were heavily attracted to pig production by good returns in the latter part of the 1970's. Although feeder pig production involves substantial price risk, often moving quickly between large losses and high profits, it can be started quickly with less investment than a farrow-to-finish enterprise. Of those farmers who sold feeder pigs in 1980, 40 percent were newcomers having produced no hogs or pigs in 1975 (table 7). Some were not even in the business of farming in 1975, but most operated farms that did not include hog production that year (app. table 12). They accounted for 38 percent of the total sales of feeder pigs in the North Central region in 1980 and 32 percent in the Southeast (table 6). These new entrants accounted for a sizable share of total sales from farms with all sizes of enterprises, but they sold more than half of the total from farms with 1980 sales of 5,000 head or more (app. table 10).

Most 1980 feeder pig producers who were producing hogs in 1975 had the same type of hog enterprise in both years (table 7). About 1 in 10 had shifted from farrow-to-finish in 1975 to sales of

feeder pigs in 1980. Such a change in type of enterprise may be a temporary shift, but on some farms it probably reflected the closeout phase of hog production due to the exceptionally low returns in 1980.

Feeder pig finishers face many of the same risks and are influenced by the same economic conditions as pig producers. They can enter production the most quickly of all and for the least investment. Nearly a third of all feeder pig finishers in 1980 produced no hogs in 1975 (table 7). They accounted for over a fifth of total sales from all feeder pig finishing operations in 1980 (table 6). These producers revealed less stability as to type of hog enterprise: one of every three who produced hogs in both 1975 and 1980 had operated farrow-to-finish enterprises in the earlier period. Comments from such producers during the course of the survey indicated that depressed returns had made it possible for them to buy pigs for finishing in 1980 for less than it cost to produce them. Farrowing facilities exist on these farms, so producers may later switch back to farrow-to-finish production. This is one illustration of the industry's capacity to adjust, perhaps rather quickly, once production capacity is in place.

Farms with farrow-to-finish hog enterprises not only account for most of the total hog production, they are also the most stable sector, especially in the North Central region. Only 8 percent of the farmers producing hogs in farrow-to-finish enterprises in the North Central region in 1980 had started hog production after 1975 (table 7), and these new entrants accounted for only 7

**Table 6—Hog and pig production in 1980 by farmers who produced no hogs or pigs in 1975, by type of hog enterprise and region<sup>1</sup>**

Enterprise	North Central		Southeast	
	Farmers not farming in 1975	Farmers selling no hogs or pigs in 1975 <sup>2</sup>	Farmers not farming in 1975	Farmers selling no hogs or pigs in 1975 <sup>2</sup>
	Percent of 1980 hog or pig production			
Feeder pig production	11	38	24	32
Farrow-to-finish	4	7	10	20
Feeder pig finishing	11	19	9	26

<sup>1</sup>See appendix table 10 for data by size of enterprise.

<sup>2</sup>Includes farmers who were not farming in 1975 and those who were farming in 1975, but sold no hogs or pigs.

**Table 7—1975 status of hog production by farmers producing hogs in 1980, by type of hog enterprise and region**

Enterprise and region	Status of hog production in 1975 <sup>1</sup>			
	Producing no hogs or pigs	Feeder pig production	Farrow-to-finish	Feeder pig finishing
<i>Percent of 1980 farms</i>				
Feeder pig production:				
North Central	45		49	5
Southeast	18		76	5
Both regions	40		54	5
Farrow-to-finish:				
North Central	8		6	85
Southeast	22		2	72
Both regions	10		6	83
Feeder pig finishing:				
North Central	29		5	21
Southeast	37		2	17
Both regions	30		5	21

<sup>1</sup>When the enterprise types match, farms were conducting the same type of hog production in 1975 and 1980. Otherwise, farmers either operated a different type of hog enterprise in 1975 or produced no hogs or pigs. Information is not available on farms that may have dropped out of hog production between 1975 and 1980.

percent of total sales in the region. This is similar to the change during a 5-year period in any kind of farming. New entrants were more important in the Southeast, accounting for approximately a fifth of both producers and sales for the region in 1980.

Farmers with farrow-to-finish hog enterprises can easily shift to producing pigs for sale or to purchasing and finishing feeder pigs. They have the facilities and production experience for either program. Once established, however, most continue to operate farrow-to-finish enterprises as long as they remain in hog production. Over 90 percent of all producers with farrow-to-finish enterprises in 1980 had the same type of enterprise in 1975 if they produced any hogs. A small percentage of producers advanced from pig production in 1975 to farrow-to-finish production in 1980, but this is a common route toward specialization in hog production. Farmers with limited capital first invest in farrowing facilities and become experienced in producing pigs. If successful in that venture, they then expand into production of slaughter hogs.

Most farmers who were producing hogs in 1980 but not in 1975 built new facilities; they did not simply acquire a farm with hog production facilities or reactivate facilities not in use on farms they were operating. Of the major high-cost buildings used in hog production—the farrowing houses, nurseries, and growing-finishing buildings—those constructed after 1975 accounted for two-thirds or more of the total building capacity in use on these farms in 1980 (table 8). Only for pig finishing was substantial use made of older buildings. As prices for feeder pigs skidded to extreme lows in the late 1970's, some new entrants into farming obviously tried to take advantage of the apparent bargains by buying pigs and using any available buildings for shelter.

**Table 8—Major hog buildings constructed 1975-80 on farms producing hogs in 1980 but not in 1975, by type of hog enterprise<sup>a</sup>**

Enterprise and building	Farming in 1975 but not producing hogs	Not farming in 1975
<i>Percent of building capacity constructed 1975-80</i>		
Feeder pig production:		
Central farrowing house	72	66
Nursery	86	66
Farrow-to-finish:		
Central farrowing house	66	68
Nursery	68	81
Growing-finishing	66	82
Feeder pig finishing:		
Growing-finishing	62	19

<sup>a</sup>Date of construction is defined as the year built or the year of last remodeling equivalent to one-third or more of the cost of new construction.

## General Farm Characteristics

Current production technologies allow all hog production activities to occur within buildings specially designed for each phase of hog production. All production inputs can be purchased. Specialization of this nature now dominates, for example, poultry production and commercial cattle feeding; it may one day characterize hog production, but in 1980 it was rare.

The technical aspects of hog production differ little whether hogs are produced on specialized or diversified farms, but the economic aspects differ widely when hog production is one of several enterprises rather than the sole enterprise of a farm business. In 1980, most hogs were produced on farms that grew crops, especially feed grains, and raised other livestock, even when the hog enterprise was quite large. The makeup of the farm business of which hog production is a part has a major bearing on the type of hog enterprise, methods of production, and producer response to varying conditions. Important farm characteristics include: the amount and quality of farmland associated with the operation; type, size, and relative importance of the hog enterprise; enterprise mix; sources of farm income; tenure status of the producer; and the form of business organization.

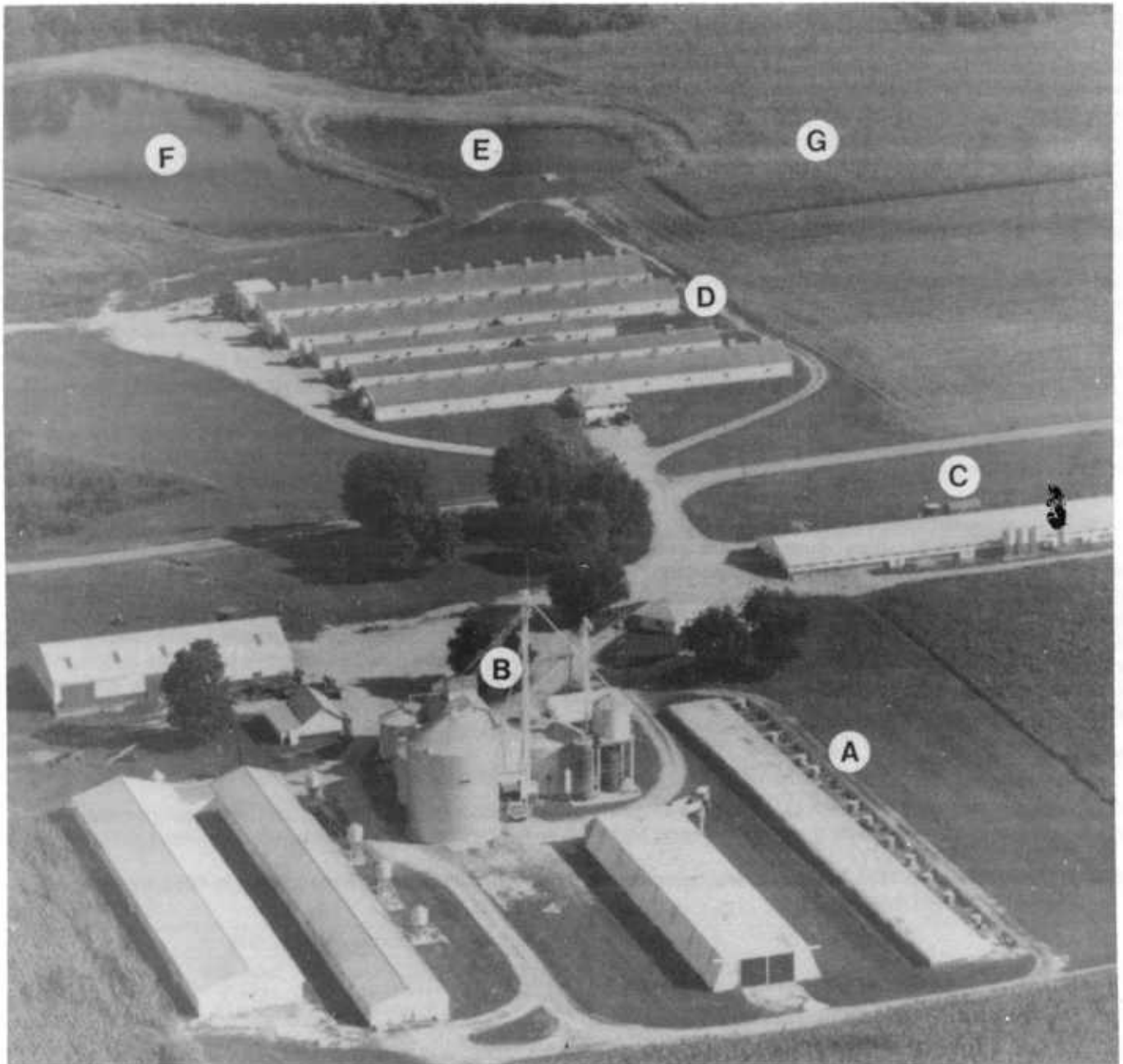
## Land in Farms

Farms that sold 100 head or more of hogs or pigs in 1980 were usually rather large (table 9). Those with feeder pig production enterprises were 20-30 percent smaller than the average of all farms in their region, and the land was somewhat lower in quality (18). Farms on which slaughter hogs were raised were 20-50 percent larger than average, and a much higher proportion was cropland. This difference in resource base is a major factor influencing the type of hog enterprise. Farms with limited and less productive land are better suited for producing feeder pigs for which labor and facilities are the major requirements. Feed grains are a major requirement for production of slaughter hogs.

**Table 9—Average farm acreage and proportion that is cropland, by type of hog enterprise and region, 1980<sup>1</sup>**

Enterprise	Land per farm		Cropland per farm	
	North Central	South-east	North Central	South-east
	<i>-----Acres-----</i>		<i>-----Percent-----</i>	
Feeder pig production	278	218	58	48
Farrow-to-finish	425	429	72	60
Feeder pig finishing	554	376	84	61

<sup>1</sup>Appendix table 13 provides data for farms by size of hog enterprise and tenure status of the operator.



This farrow-to-finish confinement hog operation in Illinois produces 15,000 head per year and reflects the most advanced production methods in terms of both size and technology. The buildings include farrowing houses, nurseries, growing-finishing units, and shelter for breeding animals. Typically, only the breeders have access to the outside (small paved areas—A—next to building at bottom right). The feed storage and processing system (B—center forefront) turns out complete ground and mixed rations formulated specifically for hogs in different stages of development. Many such systems are designed to deliver feed via high-pressure air through underground pipes to the tanks at the ends or on the sides of the buildings. Buildings in the forefront

have slotted floors above storage pits for liquid manure. Liquid manure spreader (C), which applies manure to cropland, pulled by tractor can be seen just above building extending to the right. Buildings at top center (D) are cleaned by a flush system with water drawn from the small lagoon (E—top center) and returned to the large one (F) for settling of solids. Farm produces corn as well as hogs (see fields at upper right—G). Each week, this farm sells two or three semi-truck loads of its high-quality slaughter hogs direct to a packer, after weighing them on the farm's certified scales. Machinery, equipment, and facilities for such an operation would cost around \$2.5 million at 1983 prices.

Production of hogs does not require that feed grains be produced on the same farm. All feedstuffs can be purchased and some totally specialized operations do so. Nevertheless, the acreage farmed and size of hog enterprise were directly related on farms that produced slaughter hogs in 1980. Those with annual sales of 5,000 or more slaughter hogs included up to four times as much cropland as the average farm (app. table 13). Farmers who have been successful in hog production tend to invest their earnings in more land either by purchasing the land outright or renting the land and purchasing more equipment to operate it. The larger capital base and supply of feed grains help to develop and maintain larger hog operations. Also, the program for managing hog wastes is closely associated with the amount of cropland available, especially in the North Central region.

Farm acreage in 1980 also increased with size of feeder pig production enterprises, but only to a point. Farm acreage tended to level off when annual sales reached about 1,000 head, then declined as larger feeder pig enterprises moved toward greater specialization in pig production.

Tenure status of the farm operator had a major impact on the amount of land farmed. Generally, owner-operated units were the smallest; part-owned farms were the largest, ranging to nearly three times the average size of owner-operated farms (app. table 13). Fully rented farms were of intermediate size, but only a small part of total hog production was carried out on rented farms. Farms that are part owned and part rented commonly produce hogs on the owner-operated portion, while the rented land is used only for crop production.

## Change in Land Farmed

Adding or expanding a hog enterprise has long been the typical means, at least initially, for enlarging a farm business. Most

farmers, however, want more land—either to purchase or to rent. Even operators of highly successful single-enterprise hog operations often invest their earnings in land and become diversified crop-hog farmers.

In the late 1970's, farmers apparently put much of their high earnings from producing hogs into acquiring more land either by purchase or by rental. About a third of all farms producing hogs increased their landholdings by more than 25 percent (table 10). Relatively few farmers reduced their land base during this period. By comparison, the average acreage in all farms remained the same in the North Central region between the nearest census periods of 1974 and 1978, and increased only 7 percent in the South (18).

Specialization in hog production took place to some extent at the expense of field crop production, as some farmers managed less land but produced more hogs in 1980 than in 1975. Mostly, however, the shifts in land base and volume of hog production moved together. Farmers who more than doubled the acreage of land they farmed between 1975 and 1980 increased hog production from twofold to fourfold over the same period (table 11). Those who farmed less land often cut hog production as well. In part, this may reflect older farm operators reducing their overall production.

The large expansion by some farmers between 1975 and 1980 in both land farmed and hog production helps to explain why many farmers were encountering financial difficulties by the end of 1981. It was the third consecutive year of low returns to hog production. Crop yields had been hurt by the widespread drought in 1980; then record-high crop production in 1981 caused crop prices to decline sharply.

## Land Use

Hog producers grew the cash and feed crops common in their regions in 1980. Nearly all raised corn, most produced soy-

**Table 10—Land farmed in 1980 relative to land farmed in 1975 by farmers producing hogs or pigs in 1980, by type of hog enterprise and region<sup>1</sup>**

Enterprise and region	Change in land farmed <sup>2</sup>	Land farmed in 1980 compared with 1975				
		Same land (76-125 percent)	More land (126-200 percent)	Much more land (over 200 percent)	Less land (50-75 percent)	Much less land (less than 50 percent)
	Percent	Percent of farms				
Feeder pig production:						
North Central	161	62	17	17	3	1
Southeast	123	54	24	7	7	7
Farrow-to-finish:						
North Central	126	68	18	5	7	2
Southeast	129	63	15	7	14	1
Feeder pig finishing:						
North Central	133	71	16	6	2	5
Southeast	150	39	19	15	3	24

<sup>1</sup>Includes only farms active in 1975 as well as 1980. See appendix table 4 for data by size of hog enterprises.

<sup>2</sup>Ares of land farmed in 1980 divided by acres farmed in 1975.

**Table 11—Land farmed and hogs and pigs produced in 1980 compared with 1975, by type of hog enterprise and region<sup>1</sup>**

Enterprise and region	Land farmed and hogs produced in 1980 versus 1975				
	Same land (76-125 percent)	More land (126-200 percent)	Much more land (over 200 percent)	Less land (50-75 percent)	Much less land (less than 50 percent)
<i>Hogs produced in 1980 as percent of 1975</i>					
Feeder pig production:					
North Central	145	150	413	113	44
Southeast	181	236	292	100	82
Farrow-to-finish:					
North Central	146	162	433	83	144
Southeast	139	120	333	84	223
Feeder pig finishing:					
North Central	344	167	222	89	131
Southeast	164	126	287	101	145

<sup>1</sup>Includes only farms in business and producing hogs in both 1975 and 1980.

beans (app. table 15), and about a fourth produced wheat. More than a third of the farms in the North Central region grew oats, which were seldom grown by farmers in the Southeast. Legume crops—alfalfa in the North Central region and other types of legumes in the Southeast—were produced on many farms, primarily for feed for beef cattle. Tobacco and peanuts were grown on a number of the farms in the Southeast. Other crops were seldom grown on more than 10 percent of all farms with the various types of hog enterprises.

Corn and soybeans dominated the cropping programs for all hog farms, accounting for 66 percent or more of total cropland use (table 12). Corn ranked first in the North Central region; soybeans in the Southeast. All other grains combined, including wheat, took no more than 15 percent of total cropland. Forage crops took about the same proportion. No other crops were significant in terms of use of cropland.

Soybeans were essentially sold as a cash crop in both regions. Tobacco, cotton, and peanuts were additional cash crops in the Southeast. Typically, half or more of all other crops were fed to livestock. Even a substantial portion of the wheat produced was used for feed. Farms with the largest hog enterprises usually fed most of the feed crops that they raised, but the proportion of feed crops fed rather than sold was relatively high even on farms with small hog enterprises because of the presence of other types of livestock, particularly beef cattle.

### Sales of Hogs

Sales of all hogs and pigs from farms selling 100 head or more in 1980 averaged from 431 to 507 head per farm depending upon type of hog enterprise and region (table 13). Overall, these sales were about 10 percent above the comparable figures reported in the 1978 Census of Agriculture.

The Southeast had a higher proportion of total production in exceptionally large operations than did the North Central region.

**Table 12—Average acreages of selected crops produced per farm and the proportion fed to livestock, by type of hog enterprise and region, 1980<sup>1</sup>**

Region and crop <sup>2</sup>	Feeder pig production		Farrow-to-finish		Feeder pig finishing	
	Land		Land		Land	
	Fed		Fed		Fed	
	Acre	Percent	Acre	Percent	Acre	Percent
North Central:						
Corn	74	58	151	72	218	55
Soybeans	60	0	65	10	155	*
Wheat	4	*	15	80	45	30
Other grains	7	77	26	71	28	51
Legumes	13	88	36	81	24	63
All other	*	3	2	3	2	3
Total	158	3	295	3	472	3
Southeast:						
Corn	25	80	87	80	79	80
Soybeans	32	7	93	*	94	*
Wheat	6	73	15	29	15	21
Other grains	6	37	9	67	8	92
Legumes	14	93	15	71	22	88
Tobacco	2	0	4	0	4	0
Cotton	*	0	7	0	1	0
Peanuts	1	0	12	0	9	0
All other	1	3	2	3	2	3
Total	87	3	244	3	234	3

\* Less than 0.5 acre or 0.5 percent.

<sup>1</sup>Producers listed a maximum of their five most important crops, including acreages double cropped, such as soybeans after small grain. The total acreage of crops identified therefore is not precisely equal to cropland available. The proportion of production fed pertains to use by all livestock on the farm regardless of kind.

<sup>2</sup>Other grains include barley, grain sorghum, oats, and rye. Legumes include alfalfa and other legumes and legume-grass mixes grown on cropland.

<sup>3</sup>Not estimated.

As a result, sales from the largest class of feeder pig operations averaged over 16,000 head per farm in the Southeast, compared with an average of about 9,300 head in the North Central

**Table 13—Hogs and pigs sold per farm in 1980, by type and size of hog enterprise and region**

Type and size of enterprise and region	Feeder pigs <sup>1</sup>	Slaughter hogs <sup>2</sup>	Cull breeding stock <sup>3</sup>	Other <sup>4</sup>	Total
<b>Feeder pig production:</b>					
Head					
North Central—					
100 to 199	137	15	3	0	155
200 to 499	322	21	16	*	358
500 to 999	655	27	17	0	699
1,000 to 1,999	1,207	99	34	*	1,341
2,000 to 4,999	2,629	135	80	*	2,844
5,000 & over	9,037	61	232	9	9,339
Average per farm	456	27	15	*	499
Southeast—					
100 to 199	148	4	6	0	150
200 to 499	328	4	12	3	339
500 to 999	719	50	26	3	798
1,000 to 1,999	1,268	58	37	3	1,365
2,000 to 4,999	2,898	256	57	1	3,213
5,000 & over	14,494	1,350	254	0	16,098
Average per farm	466	25	14	2	507
Both regions, all sizes	458	27	15	*	501
<b>Farrow-to-finish:</b>					
North Central—					
100 to 199	1	134	8	0	143
200 to 499	3	309	14	*	326
500 to 999	9	643	27	1	680
1,000 to 1,999	17	1,274	51	*	1,342
2,000 to 4,999	38	3,063	83	3	3,188
5,000 & over	201	7,548	401	123	8,273
Average per farm	6	456	20	1	482
Southeast—					
100 to 199	1	136	6	0	143
200 to 499	4	293	10	1	309
500 to 999	16	648	27	2	692
1,000 to 1,999	28	1,321	38	3	1,391
2,000 to 4,999	80	2,813	81	9	2,982
5,000 & over	140	9,123	242	2	9,508
Average per farm	7	414	14	10	437
Both regions, all sizes	6	451	19	1	477
<b>Feeder pig finishing:</b>					
North Central—					
100 to 199	0	155	0	0	155
200 to 499	0	316	2	0	318
500 to 999	4	732	3	0	738
1,000 to 1,999	2	1,293	1	0	1,297
2,000 to 4,999	0	2,771	1	0	2,772
5,000 & over	0	7,382	13	0	7,396
Average per farm	1	476	1	0	478
Southeast—					
100 to 199	0	117	*	0	118
200 to 499	9	276	2	0	287
500 to 999	0	716	0	*	716
1,000 to 1,999	0	1,374	4	0	1,378
2,000 to 4,999	2	2,992	7	0	2,996
5,000 & over	93	11,332	28	67	11,520
Average per farm	4	425	1	*	431
Both regions, all sizes	4	469	1	*	472

\*Less than 0.5 head.

<sup>1</sup>Pigs sold to be finished for the slaughter market on another farm.

<sup>2</sup>Barrows and gilts sold for slaughter.

<sup>3</sup>Cull sows and boars sold for slaughter.

<sup>4</sup>All sales not included in the first three categories such as hogs for breeding or unsound animals.

region. The average sizes of the largest pig-finishing operations differed similarly—11,500 head in the Southeast versus 7,400 head in the North Central region. The largest class of farrow-to-finish operations were nearer the same size in the two regions, but producers in the Southeast still sold about 15 percent more hogs per farm than did their counterparts in the North Central region.

Farmers normally sell a mix of different kinds of hogs regardless of the type of hog enterprise they operate. Feeder pig producers and operators of farrow-to-finish enterprises cull their breeding stock to sell for slaughter. Both may sell some younger animals that are unsound or not performing well. Sometimes a few head are sold for breeding or for other special purposes.

Even under the stressful economic conditions in 1980, however, hog producers maintained a high degree of enterprise purity. Feeder pigs accounted for over 91 percent of all sales from farms with feeder pig enterprises. Slaughter hogs were 95 percent of sales from farrow-to-finish operations; over 99 percent of the total from farms with finishing operations. The pressures to stay with one type of enterprise—available resources and markets, kinds of facilities and equipment in place, production experience, the added risk of diseases if hogs are brought into an operation in other than the normal program—kept enterprise mixing to a minimum even though the extended period of low returns may have encouraged some shifts, at least on a temporary basis.

### Other Livestock Enterprises

Hog producers typically produced other livestock also (table 14). Feeder pig producers in both regions and farmers with farrow-to-finish enterprises in the Southeast had moved the

closest to having hogs as the only livestock enterprise, but nearly 60 percent of these farmers carried livestock other than hogs. Over 75 percent of all other farmers had one or more livestock enterprises in addition to hogs. Even many hog producers with annual sales of 5,000 hogs or more raised other livestock as well (app. table 16).

Beef cattle were produced on many hog farms in both the North Central and Southeast regions. Generally, at least half of all farms had some type of beef enterprise (table 14). Beef cow herds were common, especially in the Southeast. A near equal proportion of farms handled combinations of beef enterprises, mostly beef cows and stocker cattle, but a significant number also had beef cow and cattle-feeding enterprises, especially farmers in the North Central region who concentrated on grain production and the finishing of feeder pigs.

Dairy, sheep, and poultry were produced on a few farms. A mixture of these enterprises along with some type of beef production was more common than any one of them alone with hog production.

The crop and livestock enterprises on these farms in 1980 reflected substantial enterprise diversification. Yet in terms of livestock production, there had been a gradual shift toward specialization in hog production since 1975. Between 1975 and 1980, the proportion of farms with hog production as the only livestock enterprise increased in nearly every situation (app. table 17). The rate of change, however, was typically quite low, resulting in an average of 1 percent more farms shifting to hogs as their only livestock enterprise each year between 1975 and 1980. This shift toward specialization in hog production resulted from a small proportion of farmers with each of the other types of livestock and poultry enterprises dropping out of production

**Table 14—Farms producing other type of livestock in addition to hogs, by type of hog enterprise and region, 1980**

Enterprise and region	Other livestock <sup>1</sup>							
	None	Beef cows	Cattle feeding	Combinations of beef enterprises	Dairy	Sheep	Poultry	All others
Percent of farms								
Feeder pig production:								
North Central	41	27	1	16	3	*	8	4
Southeast	44	23	16	13	0	1	*	3
Farrow-to-finish:								
North Central	22	22	8	21	8	3	*	16
Southeast	42	34	*	16	*	0	4	4
Feeder pig finishing:								
North Central	24	14	14	25	8	1	*	14
Southeast	23	54	1	4	11	0	1	6

\*Less than 0.5 percent.

<sup>1</sup>Enterprises are listed as the only livestock in addition to hogs or as specific combinations of enterprises. Combinations of beef enterprises include any combination of beef cows, stocker cattle, and cattle feeding. The "all others" category includes farms with all combinations of livestock and poultry enterprises not explicitly specified.

between 1975 and 1980 coupled with a lesser number who added other livestock enterprises over the period. The number dropping a specific enterprise was nearly always greater than the number adding it, hence the overall decline in the proportion of farmers with livestock enterprises other than hogs.

Livestock enterprises other than hogs that were kept in both 1975 and 1980 were mostly kept the same size or enlarged over the period. Only 9 percent of the beef cow and cattle feeding enterprises in operation both years were smaller in 1980 than in 1975; nearly four times as many had been enlarged with the size of the rest remaining the same. Sizes of other types of livestock enterprises followed a similar pattern. Farmers seemed to prefer to drop an enterprise entirely than to reduce its size.

## Income Sources

The considerable diversification of enterprises on farms that produced hogs in 1980 is borne out by estimates of the proportion of gross farm income derived from various crop and livestock enterprises that year (table 15). The typical hog producer more nearly operated a crop farm on which livestock were produced than a specialized livestock farm. Based on 1980 commodity prices, crop sales, which do not include the value of farm-grown feeds fed to livestock, accounted for one-third to nearly two-thirds of average gross farm income, being most important on farms in the North Central region that had feeder pig finishing enterprises. Crops would have accounted for substantially more than half of average farm production for farms with all types of hog enterprises in both regions if considered on a value-added basis.

**Table 15—Amount and sources of gross farm income, by type and size of hog enterprise and region, 1980<sup>1</sup>**

Enterprise, region and income source	Unit	Size of enterprise (head)						
		100	200	500	1,000	2,000	5,000	All
		to 199	to 499	to 999	to 1,999	to 4,999	and over	sizes
<b>Feeder pig production:</b>								
North Central—								
Gross	\$1,000	18	83	59	100	162	345	61
Crops	Pct	13	78	36	40	23	1	56
Livestock	Pct	87	22	64	60	77	99	44
Hogs	Pct	35	18	45	55	69	98	33
Southeast—								
Gross	\$1,000	17	31	46	86	192	707	36
Crops	Pct	40	54	30	36	30	7	37
Livestock	Pct	60	46	70	64	70	93	63
Hogs	Pct	34	41	67	62	67	91	54
<b>Farrow-to-finish:</b>								
North Central—								
Gross	\$1,000	63	98	187	219	439	906	120
Crops	Pct	43	40	27	25	25	8	33
Livestock	Pct	57	60	73	75	75	92	67
Hogs	Pct	22	32	34	57	69	86	38
Southeast—								
Gross	\$1,000	49	77	139	200	396	1,098	89
Crops	Pct	63	49	44	28	19	13	44
Livestock	Pct	37	51	56	72	81	87	56
Hogs	Pct	28	38	47	65	70	82	46
<b>Feeder pig finishing:</b>								
North Central—								
Gross	\$1,000	51	188	162	264	285	578	147
Crops	Pct	68	74	53	42	27	17	63
Livestock	Pct	32	26	47	58	73	83	37
Hogs	Pct	18	11	29	31	61	81	20
Southeast—								
Gross	\$1,000	44	85	104	122	268	819	77
Crops	Pct	36	73	34	46	20	7	47
Livestock	Pct	64	27	66	54	80	93	53
Hogs	Pct	15	20	44	48	68	90	33

<sup>1</sup>See appendix tables 18-20 for more detail on sources of gross income for these farms.



Crop sales were a relatively small part of gross farm income for farmers with the smallest hog enterprises, especially those who produced feeder pigs. This was due partly to the production of other types of livestock, but occurred mostly because these farms were either low-income or part-time operations with a small gross farm income from all sources. Crop sales typically accounted for half to three-fourths of gross income on farms with the next larger size of hog enterprises, especially where feeder pigs were produced or finished. Farmers tended to give more emphasis to total livestock production when hogs were produced in a farrow-to-finish operation. Crops accounted for a smaller part of gross income as the size of the hog enterprise increased, regardless of the type of hog enterprise.

Corn and soybeans accounted for most of the gross income from the sale of crops in the North Central region. All other crops combined amounted to no more than one-sixth of the sales from these two crops. In the Southeast, corn and soybeans produced about half of the gross income from crops; tobacco and peanuts accounted for most of the remainder, with small amounts from cotton and a variety of other crops (app. tables 18-20). The relative importance of the various crop enterprises was the same regardless of the size of the hog enterprise.

Farmers with smaller hog enterprises received from as little as a tenth of their 1980 gross farm income from hogs in finishing operations to as much as a third with feeder pig production and farrow-to-finish operations (table 15). Hogs generated a larger share of total gross income as size of enterprise increased. Producers with annual sales of 1,000 head or more typically received more than half of their gross farm income from hogs. Farms with the largest hog operations—those with sales of 5,000 hogs or more—earned over 90 percent of their gross farm income from hogs in feeder pig producing operations; 80-90 percent when market hogs were produced in either farrow-to-finish or pig finishing operations. The low prices received for hogs in 1980 of course depressed their contribution to gross income on all farms.

Beef cattle enterprises were significant income producers; on farms with the smaller hog enterprises, beef cattle occasionally accounted for a larger share of gross farm income than did hogs. Dairy, too, was important in association with the smaller hog enterprises. Farmers selling more than 1,000 hogs, however, tended to specialize in hog production. Though other types of livestock were frequently produced, their contribution to farm income was generally quite small. Continuation of the long-term trend toward fewer, larger, and more specialized hog operations will leave producers increasingly dependent upon hogs as their major or sole source of farm income.

Farmers' gross income varied directly with the size of their hog enterprise. Farms with small hog enterprises had low gross incomes; they did not include other counterbalancing enterprises, either crop or livestock. Those with large hog enterprises generated the most income, mostly as a result of greater hog production, but they also had larger overall farm businesses.

Hog producers in the North Central region generated up to nearly twice as much gross income per farm in 1980 as those in the Southeast with the same size of hog enterprise, mainly because the North Central farm had more cropland. The smallest volume feeder pig producers had equally low income in both regions—only \$17,000-\$18,000 per farm. Gross income per farm rose as farms operated larger and larger hog enterprises, but in each case, farms in the North Central region held a sizable advantage, except for farms with hog sales of 5,000 head or more. Large-volume feeder pig producers in the Southeast generated an average of nearly three-quarters of a million dollars per farm—more than twice that of their North Central counterparts. Producers selling 5,000 head of hogs or more from farrow-to-finish and feeder pig finishing enterprises had average gross incomes in 1980 ranging from nearly \$600,000 to more than \$1 million. But with each type of enterprise, producers in the Southeast averaged \$200,000-\$300,000 more gross income than did those in the North Central region because they operated much larger hog enterprises.

Those averages, although accurately portraying the diversified nature of farms that produced hogs in 1980, totally mask the extent of complete specialization in hog production. Feeder pig producers had moved the furthest toward complete specialization in hog production, that is, no crops produced for feed or sale and no livestock enterprises other than hogs. Such single-enterprise operations accounted for 15 percent of all pig producers in the North Central region and 8 percent of those in the Southeast (table 16). More than a third of those selling 5,000 head or more in the Southeast produced nothing but hogs; 91 percent of the largest feeder pig operations in the North Central region were totally specialized in hog production. Specialization in farrow-to-finish and feeder pig finishing was quite limited in the North Central region and accounted for only about 5 percent of all producers in the Southeast, largely because grain production and feeding of hogs for the slaughter market are strongly complementary. Many of the largest volume producers with these two types of hog enterprises, however, produced nothing but hogs, especially in the Southeast.

Except for feeder pig production, farmers in the North Central region did not operate small- to mid-size hog enterprises as their sole farming activity. In the Southeast, however, small single-enterprise hog operations were rather common, accounting for 5-25 percent of all producers. Such factors as regional differences in nonfarm employment opportunities, amount and productivity of land, and attractive returns from hog production in the late 1970's largely accounted for this pattern.

Most producers with the smaller hog enterprises and no other farm activity in 1980 had only a small acreage of land, most likely used primarily as a home site, with off-farm work the major source of income. Such small landholdings are rather common in the Southeast; less so in the North Central region, except in areas containing a high proportion of nonillable land, which generally lie outside the areas of concentrated grain and hog

production. Feeder pig production enterprises are more attractive to people with such small holdings because of the emphasis on labor rather than on feed.

The extended profitability of hog production in 1976-78 probably encouraged a number of rural people to begin raising hogs on a part-time basis. Nearly a third of all those with no farm enterprise except feeder pig production—80 percent of those in the Southeast—started their pig operation after 1975. Forty percent of those who did nothing but finish pigs started production during this period. Few probably started soon enough to realize much more than the subsequent years of large losses. Small single-enterprise farrow-to-finish operations were mostly continuing businesses, but even with them, 25 percent entered production after 1975. Most of the smaller single-enterprise hog operations that existed in 1980 were probably set up to profit from the slow buildup in hog production. The number of small single-enterprise hog operations is unlikely to increase on a trend basis, and many such producers who started production after 1975 probably account for part of the cuts in production that occurred in 1981 and 1982.

Large single-enterprise hog operations may become more important, especially in the Southeast, though prolonged periods of low returns like those from 1979-81 severely strain financial reserves. Also, past tendencies of single-enterprise hog producers to invest their earnings in more farmland will probably continue to some extent. The longer range outcome of enterprise specialization remains uncertain. Small single-enterprise hog operations face competitive disadvantages in nearly every aspect of the business.

### Tenure of Farm Operator

Relatively few hogs are produced on fully rented farms. In 1980, rented farms accounted for less than a sixth of all farms producing hogs in the North Central region, down from about a fifth 5 years earlier (app. table 21). In the Southeast, fully rented farms

amounted to 6 percent or less of all farms that produced hogs and were virtually nonexistent in feeder pig producing operations. Producers with the larger hog operations seldom operated fully rented farms in either region.

Part-owned farms dominated the tenure arrangements on farms that produced hogs in 1980, both in the North Central and Southeast regions, accounting for half or more of the total. Typically, the owned portion of such farms includes the hog production facilities. The rented portion may be operated on either a share or cash rental basis, but the landlord seldom has a vested interest in the hog enterprise. The rented land is used primarily to produce crops.

Shared interests in hog production between tenant and landowner are likely to decline further in the future. Bare land is a relatively flexible investment. It can be sold or rented to a wide variety of users for many purposes. Once extensive hog production facilities become a part of the farm, however, much of this flexibility is lost. Confinement hog production facilities require substantial investments of capital. While a profitable rental arrangement may be made between an owner and tenant, the risk is much greater than with a cropping operation. Technological advances in production facilities occur continuously. An owner who wishes to sell the farm may realize only a fraction of the investment in the hog production facilities due to obsolescence and, more important, the greatly reduced number of buyers with an interest in a farm with precisely that type and capacity of hog production facilities. Finding another tenant capable of operating a specialized hog farm is similarly restrictive. Construction of specialized facilities for the production of hogs on a farm to be rented is rapidly becoming an unattractive investment.

### Organization of the Farm Business

Sole proprietorships accounted for about 80 percent of all farms that produced hogs in 1980 (table 17), down somewhat from 1975. General partnerships, most commonly composed of fam-

Table 16—Farms producing only hogs, by type and size of hog enterprise and region, 1980<sup>1</sup>

Size of enterprise (head)	Feeder pig production		Farrow-to-finish		Feeder pig finishing	
	North Central	Southeast	North Central	Southeast	North Central	Southeast
Percent of farms						
100 to 199	0	8	0			
200 to 499	26	4	0	2	0	4
500 to 999	20	4	0	3	0	17
1,000 to 1,999	9	27	0	11	0	20
2,000 to 4,999	0	21	1	10	2	12
5,000 & over	91	38	23	40	15	55
All	15	8	*	6	*	5

\*Less than 0.5 percent.

<sup>1</sup>These farms harvested no crops for feed or sale and sold no livestock or poultry products other than hogs. The smaller single-enterprise hog operations were most likely operated by part-time farmers.

ily members, accounted for most of the remainder. Various corporate forms of business organizations, most of which were cooperatives and family corporations accounted for less than 5 percent of all the businesses involved in hog production.

On farms with annual sales of 1,000 hogs or more (and especially those with sales above 5,000 head) sole proprietorships have given way to other forms of business organization. On these farms, gross revenues have risen to \$1 million or more annually. Partnerships, various forms of corporations, and cooperatives have become common (app. table 22). Generally, farm family members still control most of these businesses, even those producing more than 5,000 hogs per year. In some situations, however, many of the largest hog operations are no longer controlled by farm family members.

Large feeder pig production operations in the North Central region pose a unique case in terms of business organization. In years past, many farmers who produced substantial amounts of grain in this region wanted to finish hogs for the slaughter market. However, they did not want to invest either the time or money necessary to produce pigs. Nor did they find the supply of feeder pigs acceptable in quality or assured availability. This demand resulted in the formation of corporations and cooperatives to produce pigs to be finished on member farms. Over three-fourths of all feeder pig operations in the North Central region turning out 5,000 head or more in 1980 were either cooperatives or nonfamily corporations. They also accounted for most of the high proportion of large single-enterprise pig production operations in the region. Over two-thirds of the largest feeder pig operations in the Southeast were also corporate organizations in 1980, but demand for pigs to be finished on

grain-producing farms did not result in the development of pig cooperatives as in the North Central region.

Over half of the largest farrow-to-finish hog operations were managed under corporate or cooperative business arrangements. A third of the largest finishing operations in the Southeast were similarly organized but only 7 percent in the North Central region. The overall economics of increasingly larger and more complex operations that produce hogs will force a higher proportion of production of hogs and pigs under such business organizations in the future.

Corporations engaged in producing agricultural products may also have business interests outside of direct farm production. These interests sometimes involve control of input and supply businesses or processing and distributing firms for the purpose of vertical coordination. They may also involve businesses not directly related to agriculture to diversify investments. Corporations formed for agricultural production may acquire nonfarm interests or nonagricultural corporations may add agricultural enterprises.

Such diversified corporations had little involvement in hog production in 1980. Ninety-five percent of the estimated 6,700 corporations engaged in hog production in that year had no business interests other than farming. Eighty percent of the remainder, nearly all of which were family corporations, had nonfarm business interests unrelated to agriculture. In terms of nonfarm businesses related to agriculture, feed manufacturing and feed sales were most important, but involved only 0.5 percent of all corporations engaged in hog production. A tenth of one percent were engaged in agriculturally related businesses

**Table 17—Farms having specified forms of business organizations, by type of hog enterprise and region, 1980**

Type of business organization	Feeder pig production		Farrow-to-finish		Feeder pig finishing	
	North Central	Southeast	North Central	Southeast	North Central	Southeast
<i>Percent of farms</i>						
Sole proprietorship	86.3	89.1	80.9	80.1	79.1	79.7
Partnership:						
General	13.1	10.3	14.8	15.2	9.3	18.9
Limited	.3	.1	1.3	.5	4.5	.1
Standard C:						
Family corporation	*	.3	2.6	3.1	6.2	1.2
Nonfamily corporation	*	0	*	.1	.7	.1
Subchapter S:						
Family corporation	*	.2	.3	.5	.1	*
Nonfamily corporation	.2	0	.1	.1	*	0
Cooperative	.1	0	*	*	0	*
All other	0	0	0	.4	.1	0

\*Less than 0.05 percent.

of meatpacking or packer buying, livestock marketing, or farm supplies other than feeds. All corporations with nonfarm interests had either farrow-to-finish or feeder pig finishing operations. No corporations involved in feeder pig production had nonfarm interests. Data from the 1981 survey give no indication of any move toward vertical coordination of the several phases of pork production from raising hogs through retailing meat. Also, there was no indication of hog farm businesses diversifying to include nonfarm interests or of nonfarm corporations entering hog production.

## Breeding Hogs

Commercial hog production, whether in enterprises that produce pigs for sale as feeders or in farrow-to-finish operations, is based largely on continual crossing of hogs of different breeds. Commercial producers seldom maintain the purebred herds that supply hogs for sale for breeding purposes.

Producers first attempt to improve the quality of their herds by almost always purchasing, rather than raising their own boars. Choice of breed is usually secondary to the quality of the boar, though the usual practice is to rotate purchases among two or more breeds. In contrast, most producers raise their own sows, saving the best gilts from their commercial operation.

This combination of buying boars but raising females is prevalent for several reasons. Disease control is one of the more important. The more tightly a herd can be closed with respect to introduction of hogs from other farms the lower the risk of the herd's contracting diseases that may be present elsewhere. Artificial insemination would permit more complete isolation of an operation, but is not widely used in commercial production. Cost is another important factor. Improvements in genetic quality cost less in the form of a few boars than for a large number of gilts or sows.

The practice of raising rather than purchasing female replacements for the breeding herd continued in 1980 much the same as in 1975. Few farmers with farrow-to-finish enterprises purchased females for breeding purposes (table 18). Such purchases as were made were divided among sows and bred and unbred gilts, the latter being the more common choice in larger operations. Typically, the numbers bought per farm reflected replacement of an entire herd rather than a portion of it (app. table 23). Most such producers had probably experienced a health or production problem that required herd replacement on a one-time basis and were not buying females on a regular basis.

Purchase of females for breeding continued to be more common on farms that produced feeder pigs than in farrow-to-finish operations, as in 1975. Farms that produce feeder pigs are often located where feed costs more than in areas of intensive grain production. Raising female replacements is thus more costly. Further, pig producers usually are not well equipped to raise

replacements, whereas growing-finishing facilities are part of farrow-to-finish operations where replacements need only be identified so they can be separated from market hogs near the end of the finishing period. Unbred gilts were the most common choice for purchased replacements in feeder pig operations. Most producers who bought female replacements obtained all their replacements that way rather than raising some and buying others.

One-half to two-thirds of all producers bought boars during 1980; and 80-90 percent of the larger enterprises made such purchases (table 18). This is a lower level of purchase than in 1975, when hog production was relatively profitable and expand-

**Table 18—Farmers who bought breeding stock, by kind of stock, type and size of hog enterprise, and region, 1980<sup>1</sup>**

Type and size of enterprise and region (head)	None	Sows	Gilts		Boars
			Bred	Other	
<i>Percent of farmers buying breeding stock</i>					
<b>Feeder pig production:</b>					
North Central—					
100 to 199	100	0	0	0	0
200 to 499	13	51	0	54	87
500 to 999	35	3	3	10	61
1,000 to 1,999	27	7	14	18	73
2,000 to 4,999	37	0	0	26	56
5,000 & over	2	25	0	42	88
All	47	22	2	25	52
Southeast—					
100 to 199	38	8	4	6	57
200 to 499	50	12	2	12	38
500 to 999	21	12	5	16	69
1,000 to 1,999	32	13	3	9	59
2,000 to 4,999	52	5	8	24	46
5,000 & over	31	0	0	31	69
All	40	10	4	10	52
<b>Farrow-to-finish:</b>					
North Central—					
100 to 199	34	12	10	3	57
200 to 499	29	2	8	3	70
500 to 999	18	3	1	3	81
1,000 to 1,999	20	7	1	14	80
2,000 to 4,999	14	4	1	2	86
5,000 & over	21	2	7	15	79
All	28	6	7	4	68
Southeast—					
100 to 199	60	8	1	5	40
200 to 499	38	6	3	6	57
500 to 999	34	5	1	12	59
1,000 to 1,999	27	3	6	17	69
2,000 to 4,999	8	3	7	19	90
5,000 & over	11	2	0	16	87
All	47	7	2	7	50

<sup>1</sup>Data apply only to farms with feeder pig production and farrow-to-finish hog enterprises. Farmers were counted as having purchased breeding stock if they bought one or more of the specified kinds of breeding stock.

ing. In 1980, producers were beginning to reduce production and some would cease production in 1981, hence, the need to replace boars was not so great.

The price of a boar is no guarantee of his quality, but it should be a strong indicator. On this basis, the importance assigned to boars purchased in 1980 varied according to both the type and size of enterprise in which they were to be used. Producers paid an average of about 10 percent more for boars used in farrow-to-finish operations than for boars used in feeder pig production enterprises (table 19). Though this price difference was not great, and was not consistent among operations of different sizes, it is indicative of one of the weaknesses of split-phase vs. complete slaughter hog production systems. Briefly, the farrow-to-finish producer experiences all the results of a breeding program from litter size through quality of slaughter hogs. In pig production alone (split-phase), the current marketing system seldom retains the identity of pigs between producer and finisher; hence the pig producer is encouraged to invest in breeding stock only to improve breeding performance (litter size, farrowing frequency).

Large differences were recorded in the prices paid for boars by producers with different sizes of enterprises both in pig production and farrow-to-finish operations (table 19). Producers with the largest enterprises consistently paid two to three times as much for boars as did those with small enterprises. These price differences may not be a proportional reflection of differences in quality and performance, but they are a strong indication of the levels of producer commitment to improving performance.

Too few females were purchased in 1980 to provide an estimate of prices paid by size of enterprise. On an overall basis, farmers with farrow-to-finish operations bought higher quality females, as they did boars, insofar as price is a meaningful measure of quality. They paid an average of \$189 per head for bred gilts; \$135 per head for unbred gilts; feeder pig producers paid an average of \$125 and \$108, respectively.

**Table 19—Average prices paid for boars, by type and size of hog enterprise and region, 1980**

Size of enterprise (head)	Feeder pig production		Farrow-to-finish	
	North Central	Southeast	North Central	Southeast
	<i>Dollars per head</i>			
100 to 199	*	162	205	163
200 to 499	268	222	315	213
500 to 999	262	317	306	270
1,000 to 1,999	269	318	350	337
2,000 to 4,999	303	346	322	346
5,000 & over	454	543	414	430
All	274	258	305	268

\*None purchased.

Producers kept an average of one boar for each 13-14 sows in 1980 with no differences between types of enterprise or geographic location (table 20). Producers used boars for up to twice as many sows in the largest compared with the smallest enterprises, using them for several groups of sows throughout the year as opposed to the seasonal production schedules typical of small operations. Thus, even though large-volume producers paid higher prices for boars, their more intensive use of boars offset much of the cost difference compared with the smaller operations.

Biologically, sows can produce two litters of pigs in less than a year and remain in production for several years if they are properly cared for and remain physically sound. In actual practice, the length of time that producers keep sows is affected by their performance plus a number of economic factors including type of enterprise, cost of feed, expected profitability of hog production, cost of replacements, Federal income tax regulations (which qualify sales of cull breeding stock held 1 year or longer as capital gain), and current prices for hogs.

Producers' 1980 breeding programs resulted in a lower rate of replacement of females (fewer litters from first-litter gilts) in feeder pig production than in farrow-to-finish operations and on farms in the Southeast than in the North Central region (app. table 24). These relationships were consistent with practices in 1975 and reflected differences in replacement costs. Largely, however, breeding programs in 1980 reflected producer adjustments to the long period of unprofitable production. First-litter gilts (the replacements) accounted for a relatively small proportion of total production. Moreover, many farmers with the smaller enterprises had no production from first-litter gilts, thus ending the year with an aging herd of females. This suggests that such producers were considering getting out of hog production in the near future. Nearly all large-volume producers got some of their pigs from first-litter gilts, but not, on the average, any more than did small-volume producers. Had taxable income been greater,

**Table 20—Sows per boar, by type and size of hog enterprise and region, 1980<sup>1</sup>**

Size of enterprise (head)	Feeder pig production		Farrow-to-finish	
	North Central	Southeast	North Central	Southeast
	<i>Sows per boar</i>			
100 to 199	13	11	13	11
200 to 499	12	17	14	13
500 to 999	15	17	15	14
1,000 to 1,999	16	15	16	15
2,000 to 4,999	16	18	18	17
5,000 & over	23	25	21	19
All	13	14	14	13

<sup>1</sup>Estimated on the basis of the average number of sows and boars on hand during the year.

the advantages of capital gains from selling cull breeding stock would have encouraged a much more aggressive replacement program on these farms. The replacement pattern followed in 1980 thus best provides information on downside adjustments rather than long-term average practices.

## Measures of Performance

In any industry, some producers always use resources more effectively than others. That is what brings change as the more efficient win out over the less successful. Hog production is no different in this respect. Some producers are better at animal husbandry than others. More important, some are better business managers than others, and volume of production affects both unit costs and the degree to which new technologies can be adopted.

When 4 of every 10 farmers in the country produced and sold hogs or pigs, as was the case as recently as 1950, the competitive situation was based on a few rather simple factors. Nearly all hog enterprises were small and part of diversified farm businesses. Inputs were mostly farm produced. Production systems differed little among farms. Cash expenditures were relatively low. Producers remained competitive if they maintained control of diseases and were reasonably successful in saving newborn pigs.

Technologies that have become available to farmers in recent years have greatly changed the competitive situation in hog production. Total industry output changed little in the last 30 years, while the number of producers shifted from over 2 million small and relatively homogeneous units to a fifth of that number with great differences among them in size of enterprise and production practices.

Net returns realized by producers with different types and sizes of enterprises is the best aggregate measure of performance in hog production. That single measure, however, provides no information about specific components of production; furthermore, most farmers calculate returns only on the basis of their total farm business and not for each enterprise. Systems of business accounting differ among farmers such that net enterprise returns, even if they were available, would not be comparable measures of economic performance.

In the 1981 survey, performance was measured largely in terms of physical relationships. These involved the major inputs used in hog production—feed, labor, facilities, power—and the performance of breeding animals. Each is examined in detail in later sections of this report. Performance levels recorded here reveal the strengths and weaknesses of producers in 1980 and are indicative of probable future shifts in hog production.

## Performance of Hogs

The number of pigs weaned per litter is an important performance measure of both the genetic stock of the hog herd and

the attentiveness and care given by the producer. The farrowing of pigs and caring for them until weaned and ready to be placed on feed account for much of the cost of facilities, equipment, and labor used in hog production. These costs, plus the costs of production and maintenance of breeding stock, are largely unaffected by the number of pigs produced per litter. The number of pigs produced per litter is therefore one of the more important measures of performance in both feeder pig production and farrow-to-finish operations.

In 1980, producers weaned an average of 7.2-7.6 pigs per litter, depending on type of enterprise and geographic location (table 21). Litter sizes in 1980 were slightly larger in the Southeast than in the North Central region, and on farms with feeder pig enterprises than on those with farrow-to-finish operations. Mostly, these differences in productivity stem from better facilities to protect pigs from adverse weather and from programs followed for the replacement of females. Typically, females are kept in production for more litters in feeder pig production than in farrow-to-finish operations, and they are kept in production longer in the Southeast than in the North Central region. Gilts average fewer pigs per litter than do mature and proven sows; hence a lower rate of replacement of females yields a higher average number of pigs per litter. In any one year, the proportion of replacement gilts to older sows shifts directly with adjustments in total production.

The number of pigs weaned per litter rose by about 4 percent (0.3 pig) between 1975 and 1980. This resulted primarily from a greater portion of production coming from larger enterprises in 1980. Litter sizes were consistently below average on farms with the smallest enterprises. Producers with the largest enterprises, however, did not always produce the most pigs per litter in 1980 nor did they always have a higher proportion of litters from sows rather than gilts. In fact, midsize enterprises sometimes recorded equal or better performance because operators of the largest enterprises often emphasize production per unit of facilities and labor instead of size of litter.

**Table 21—Pigs weaned per litter, by type and size of hog enterprise and region, 1980<sup>1</sup>**

Size of enterprise (head)	Feeder pig production		Farrow-to-finish	
	North Central	Southeast	North Central	Southeast
	<i>Pigs weaned per litter</i>			
100 to 199	7.0	7.0	6.6	7.0
200 to 499	7.2	7.4	7.3	7.0
500 to 999	7.5	8.0	7.4	7.5
1,000 to 1,999	7.3	7.9	7.5	7.6
2,000 to 4,999	7.8	7.6	6.7	7.8
5,000 & over	8.4	7.7	7.8	8.0
All	7.4	7.6	7.2	7.4

<sup>1</sup>Includes all sows farrowing even when no pigs were saved.

Large litters are an important measure of production efficiency, but litters and the total number of pigs produced per female per year are also important in overall performance, particularly in terms of minimizing the costs of the breeding herd that must be charged against each pig. Some of the economic advantage of large litters is lost if sows remain out of production for extended periods, hence fall far below their biological capacity for producing more than two litters of pigs per year. This measure of productivity (pigs produced per female per year) was not obtained in the survey, but farm record data, compiled in a separate study, show that Illinois hog producers fell far below potential in 1980.<sup>6</sup>

The weaning age of pigs is an essential element in determining how often a sow can farrow. Sows can be bred to produce another litter shortly after the pigs from their previous litter are weaned.

Pigs averaged nearly 5.5 weeks of age at weaning in 1980, regardless of type of enterprise or location of production (table 22). Practices differed markedly, however, by size of enterprise. Producers with the smallest enterprises kept pigs with the sows for about 7 weeks. Since these farmers raise hogs only periodically, they have little pressure to clear their production facilities for subsequent groups of animals. The weaning age on farms with the largest enterprises ranged from 3.5-4.0 weeks—a reduction of 3 weeks or more compared with the average for small enterprises. Reducing the weaning age by that amount increases potential productive time for females by at least 1.5 months per year. Further, such early weaning permits more intensive use of farrowing facilities, which represent the major investment cost in pig production. The large-volume producers achieved superior performance in pig production in 1980 through higher production per litter and early weaning.

<sup>6</sup> Illinois producers farrowed 1.64 litters and weaned 12.05 pigs per female per year in farrow-to-finish operations in 1980; 1.67 litters and 11.82 pigs per female per year in feeder pig producing operations (22).

**Table 22—Average weaning age of pigs, by type and size of hog enterprise and region, 1980**

Size of enterprise (head)	Feeder pig production		Farrow-to-finish	
	North Central	Southeast	North Central	Southeast
<i>Weeks</i>				
100 to 199	7.4	7.0	6.7	6.9
200 to 499	4.7	6.8	5.8	7.1
500 to 999	4.8	7.0	5.3	6.0
1,000 to 1,999	4.9	4.7	5.2	5.0
2,000 to 4,999	5.1	4.7	4.3	4.5
5,000 & over	3.6	3.9	3.5	4.0
All	5.2	5.4	5.3	5.7

Performance in terms of lengths of production periods and rates of gain differed only slightly between the two regions. Producers sold feeder pigs 65-67 days after farrowing, slaughter hogs 175-177 days after farrowing in farrow-to-finish operations and 126-131 days after purchase of feeder pigs in finishing operations (table 23). Feeder pig producers in the Southeast achieved a slightly higher average daily gain, and used less feed per litter than did producers in the North Central region, and they also raised pigs to be about 5 pounds heavier before sale compared with producers in the North Central region.

The larger operations that produced slaughter hogs recorded no clear performance advantages over the smaller ones. Production periods were somewhat longer in the smaller operations than in the large, but market weights were heavier, varying directly with the length of the production period (table 24). Daily rates of gain were essentially the same regardless of size of enterprise.

When the hog-corn price ratio is unfavorable, as it was throughout 1980, it is usually advantageous to market slaughter hogs at lower weights. In both regions, hogs were sold at lower weights by the larger producers reflecting their adjustment to the high cost of feed. Also, hogs were sold at lower weights by producers in the Southeast than in the North Central region which reflects, at least in part, differences in feed cost between the regions.

There are many valid economic reasons for a farmer to conduct only one phase of hog production—producing feeder pigs or finishing them—as opposed to carrying out all activities in a farrow-to-finish operation. Split-phase production, however, does reduce production performance in terms of time to produce slaughter hogs of a given weight. Production periods in 1980 averaged 10-12 percent longer (some 2.5-3.0 weeks) when pigs were produced on one farm and finished on another than when all production occurred on the same farm, not counting time for marketing pigs and transporting them to the finisher. This extra production time was reported by producers in 1980 regardless of size of enterprise.

Feed efficiency is the level of efficiency in converting feed into salable hogs and pigs and is thus a primary indicator of how well hog producers are doing their job. The importance of feed in terms of its share of the total cost of producing hogs has declined over the years as producers have increased their use of purchased inputs of nonfarm origin, especially fuels and energy, machinery, equipment, and production facilities. Nevertheless, feed still accounts for a larger share of total costs of production than any other major category of inputs.

Producers reported the feed conversion ratios they achieved in 1980, according to the recordkeeping system in use. Some measured performance in terms of feed used per litter of pigs produced. Some recorded the feed used per hundredweight of hogs produced, in some cases including the feed for the breeding herd and production of cull breeding animals, while in other

cases the feed conversion rates excluded breeding animals and applied only to hogs in the growing-finishing stage.

We converted all measures of feed efficiency to a common base for each type of enterprise. Feed used per litter is the base for feeder pig production. While both output and feed use is affected by number and weight of pigs produced per litter and amount of cull breeding stock sold, breeding animals take an average of nearly three-fourths of all feed used in feeder pig production. In farrow-to-finish operations, feed efficiency is

measured according to the total feed used for all hogs, including the breeding herd, relative to live weight produced, including both slaughter hogs and cull breeding stock. Breeding stock use an average of about a fifth of total feed in this type of operation. Performance in feeder pig finishing is measured according to feed used per pound of weight gain.

Information provided by producers on feed use relative to production was incomplete, hence outcomes could not be deter-

**Table 23—Average number of days from farrowing or purchase to sale of the hogs and average pounds gained per day, by type and size of hog enterprise and region, 1980<sup>1</sup>**

Performance measure and size of enterprise (head)	Feeder pig production		Farrow-to-finish		Feeder pig finishing	
	North Central	Southeast	North Central	Southeast	North Central	Southeast
<i>Days</i>						
Production period:						
100 to 199	64	58	178	186	147	137
200 to 499	67	65	178	183	124	153
500 to 999	65	62	178	174	124	125
1,000 to 1,999	66	74	176	173	124	131
2,000 to 4,999	61	75	162	171	120	116
5,000 & over	62	72	176	173	126	118
All	65	67	175	177	126	131
<i>Pounds per day</i>						
Average daily gain:						
100 to 199	0.77	0.81	1.30	1.22	1.17	1.23
200 to 499	.69	.83	1.30	1.21	1.54	1.10
500 to 999	.66	.77	1.27	1.27	1.44	1.36
1,000 to 1,999	.73	.68	1.30	1.27	1.41	1.29
2,000 to 4,999	.70	.68	1.36	1.27	1.48	1.46
5,000 & over	.65	.60	1.24	1.25	1.42	1.46
All	.69	.73	1.30	1.24	1.42	1.29

<sup>1</sup>Average number of days in the production period is from: farrowing to sale of feeder pigs for feeder pig production enterprises; farrowing to sale of slaughter hogs for farrow-to-finish enterprises; and purchase of feeder pigs to sale of slaughter hogs for feeder pig finishing enterprises. The average daily gain in pounds is based on data in this table and in table 24.

**Table 24—Average live weight per hog at time of sale, by type and size of hog enterprise and region, 1980<sup>1</sup>**

Size of enterprise (head)	Feeder pig production		Farrow-to-finish		Feeder pig finishing	
	North Central	Southeast	North Central	Southeast	North Central	Southeast
<i>Pounds per head<sup>2</sup></i>						
100 to 199	49	47	232	226	229 (57)	224 (55)
200 to 499	46	54	231	222	234 (45)	222 (54)
500 to 999	43	48	226	221	226 (47)	225 (55)
1,000 to 1,999	48	50	228	219	225 (50)	223 (54)
2,000 to 4,999	43	51	221	218	230 (52)	220 (51)
5,000 & over	40	43	219	216	225 (46)	220 (48)
All	45	49	227	220	228 (49)	223 (54)

<sup>1</sup>Weights are for feeder pigs sold from feeder pig production enterprises and for slaughter hogs (barrows and gilts) sold from farrow-to-finish and feeder pig finishing enterprises.

<sup>2</sup>Numbers in parentheses are average weights per head of feeder pigs purchased.



mined with the same level of confidence attached to other issues in this study. One-third to half of all feeder pig producers provided no measure of feed use relative to production (table 25). A higher proportion of the producers of slaughter hogs knew how much feed they used per unit of production in 1980, but this information was lacking for many of the smaller hog enterprises, especially in the North Central region where multiple uses of farm-produced grain complicate the task of measuring the amount fed to hogs (tables 26 and 27).

Feeder pig producers who had records of feed use and hogs produced used from 2,100 to 2,300 pounds of feed per litter. Producers in the Southeast used an average of about 200 pounds less per litter while turning out slightly larger litters and heavier pigs than in the North Central region.

Performance data for feed use in the production of slaughter hogs were subject to the limitations of missing information as in feeder pig production, though to a much less degree. On the basis of farmers reporting, feeds were used with nearly the same average effectiveness in both regions—434-437 pounds of feed per hundredweight (live weight) produced in farrow-to-finish operations (essentially the same as reported in 1975) and 368-384 pounds in pig finishing. Producers in the North Central region reported results similar to those recorded by Illinois farmers who kept detailed records of feed use in 1980 (22).

Producers with the larger enterprises used feeds more effectively than did those with the smaller enterprises. For each additional 1,000 head of sales, feed use dropped by 20 pounds

per litter in feeder pig production, 2 pounds per hundredweight of gain in farrow-to-finish operations, and 1 pound per hundredweight of gain in feeder pig finishing. While these gains in feed efficiency associated with size of operation were quite small, especially for operations that produced slaughter hogs, statistically they were highly significant. In addition, the larger-volume feeder pig producers had the added advantage of producing more pigs as well as using less feed per litter.

Size of enterprise, however, was not the major determinant of feed efficiency. In fact, differences in size of enterprise were associated with a fifth or less of the variation in feed efficiency among farms. Efficiency varied much more among individual producers. The standard deviation (a measure of how far feed efficiency must be extended above or below average to include two-thirds of the producers) was 175 pounds per litter in feeder pig production, 17 pounds per hundredweight of gain in farrow-to-finish operations, and 21 pounds per hundredweight of gain in feeder pig finishing.

Lack of quantitative information seldom adds to the understanding of an issue, but in this case the pattern of nonresponse may reveal as much useful information about the hog industry as is provided by the precise feed conversion data reported by producers who kept records. Keeping records of feed use and hog production does not assure a high level of performance or that producers can achieve subsequent increases in feed efficiency. Without measurements of the use of an input as important as feed, however, producers lack one of the major guides to recognition of problems and improved performance in the production



Hogs in finishing facility, a totally confined, environmentally controlled building, where hogs are fattened for market. Those pictured are nearly ready, weighing 220-240 pounds. Slotted floors

are self-cleaning, allowing waste to drop into storage pit below, from which it is periodically pumped. Feed is delivered mechanically. Such buildings allow 8-10 square feet of floor space per hog.

**Table 25—Estimated rates of feed use in feeder pig production enterprises, by size of hog enterprise and region, 1980**

Size of enterprise (head)	North Central		Southeast	
	Amount of feed <sup>1</sup>	Farmers responding <sup>2</sup>	Amount of feed <sup>1</sup>	Farmers responding <sup>2</sup>
	<i>Pounds</i>	<i>Percent of sample</i>	<i>Pounds</i>	<i>Percent of sample</i>
100 to 199	2,311	67	2,348	33
200 to 499	2,208	31	2,066	58
500 to 999	2,184	62	2,035	57
1,000 to 1,999	2,487	60	1,743	46
2,000 to 4,999	2,260	47	2,203	78
5,000 & over	1,900	50	1,940	100
All	2,282	53	2,086	65

<sup>1</sup>Feed use is the amount fed to all hogs and pigs divided by the number of litters of pigs produced.

<sup>2</sup>Some farmers, especially those with the smaller enterprises, kept no record of feed use, hence could provide no information on rates of feed conversion.

**Table 26—Estimated rates of feed conversion in farrow-to-finish hog enterprises, by size of hog enterprise and region, 1980**

Size of enterprise (head)	North Central		Southeast	
	Amount of feed <sup>1</sup>	Farmers responding <sup>2</sup>	Amount of feed <sup>1</sup>	Farmers responding <sup>2</sup>
	<i>Pounds</i>	<i>Percent of sample</i>	<i>Pounds</i>	<i>Percent of sample</i>
100 to 199	454	48	468	90
200 to 499	418	52	463	88
500 to 999	451	61	427	92
1,000 to 1,999	423	72	418	90
2,000 to 4,999	449	74	434	96
5,000 & over	413	79	417	100
All	434	64	437	92

<sup>1</sup>Feed use is the amount fed per 100 pounds live weight of hogs produced, including the feed for and production from the entire enterprise including the breeding herd.

<sup>2</sup>Some farmers, especially those with the smaller enterprises, kept no record of feed use, hence could provide no information on rates of feed conversion.

**Table 27—Estimated rates of feed conversion in feeder pig finishing enterprises, by size of hog enterprise and region, 1980**

Size of enterprise (head)	North Central		Southeast	
	Amount of feed <sup>1</sup>	Farmers responding <sup>2</sup>	Amount of feed <sup>1</sup>	Farmers responding <sup>2</sup>
	<i>Pounds</i>	<i>Percent of sample</i>	<i>Pounds</i>	<i>Percent of sample</i>
100 to 199	344	75	398	88
200 to 499	346	68	397	62
500 to 999	402	70	392	96
1,000 to 1,999	375	69	389	95
2,000 to 4,999	366	67	375	90
5,000 & over	361	80	364	100
All	368	70	384	89

<sup>1</sup>Feed use is the amount fed per 100 pounds live weight of gain.

<sup>2</sup>Some farmers, especially those with the smaller enterprises, kept no record of feed use, hence could provide no information on rates of feed conversion.

of hogs. Over time, those who know the most about their businesses are in the best position to identify strengths and weaknesses, and to improve performance. Generally, since the larger volume hog producers were better informed in 1980 than those with smaller enterprises, the larger producers seem to be in a stronger position for the future.

### **Seasonality of Production**

Hog production has gradually changed from a seasonal to a year-round activity, at least from the standpoint of aggregate production. During the 1940's and 1950's, 60-65 percent of all farrowings occurred during December-May with the heaviest concentration in the spring after severe winter weather but before the start of crop work. Production began to be more constant throughout the year in the 1960's with the introduction of confinement systems of production. By the end of the 1970's, hog production was spread rather evenly over the year. Any seasonal variations resulted largely from industry expansion or contraction (11).

In 1980, seasonal patterns of farrowing pigs were followed only by farmers with the smallest enterprises. Quarterly farrowings were essentially the same throughout the year on farms raising 500 head or more (app. table 25). Feeder pig finishing was also a year-round activity in 1980 on all farms except those with the smaller enterprises (app. table 26).

### **Housing**

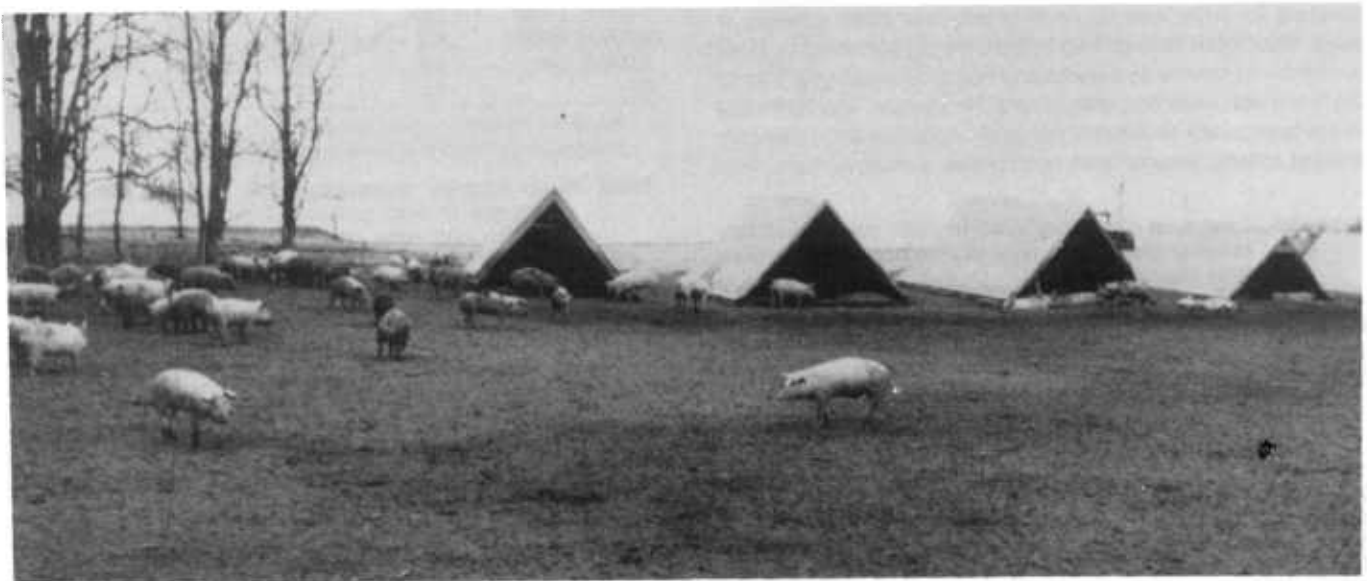
The specialized housing used in confinement production of hogs requires large capital investments. Associated ownership

costs of these facilities are also high. The amount of production per unit of investment in such facilities has therefore become an increasingly important measure of performance of an operation. Use below capacity of these facilities results in proportionally higher costs per unit of production.<sup>7</sup>

The major types of housing used in confinement hog production—central farrowing houses and nursery buildings for pig production, and growing-finishing houses to shelter hogs as they are fed to slaughter weight—are all expensive facilities. At 1980 prices, a fully equipped central farrowing house cost \$1,800-\$2,400 per sow space. Fully equipped nursery units cost from \$85-\$110 per head space. Growing-finishing buildings with equipment required an outlay of \$140-\$180 per head space. These housing units were somewhat less expensive when reduced to the basic requirements for shelter with minimal installed equipment and manure-handling features, but they still carried a high price tag.

Specialized confinement facilities make intensive year-round hog production possible. Their high fixed costs exert economic pressure for maximum year-round utilization. Production can continue at a low level of use of facilities when they already exist. When new facilities are required, however, partial use can seldom justify the investment. If it pays for an individual producer to produce at all, it is most economical to produce near the capacity of the facilities.

<sup>7</sup>The Midwest Plan Service provides detailed specifications for the design and operation of buildings and equipment used in hog production (6).



Very few hogs are still produced in extensive field systems like this, although nearly all hogs once were. Confinement allows

producers to operate year round and keeps productive cropland reserved for crops.

Large-volume producers used facilities in 1980 at a level of intensity that gave them a distinct economic advantage over farmers with small hog enterprises. Those producing 5,000 or more hogs that year were geared toward maximum use of facilities. They farrowed eight or more litters in each unit of farrowing space, moved five or more pigs through each unit of nursery space, and used their growing-finishing facilities at about 2.5 times capacity (tables 28, 29, and 30). These rates of use were essentially the maximum that can be achieved with the systems of management in use. They were about twice the intensity of use achieved in 19/5 when hog production was at a low ebb.

Farmers with small hog enterprises consistently underutilized the capacity of their facilities in 1980, partly because of seasonal production patterns and partly because facilities were not filled when in use. Large-volume producers obtained six times more production per unit of facilities than small enterprises, thereby allowing the large-volume producers to invest in the most technologically advanced types of facilities at equal or less cost per unit of production than farms with small enterprises. That held true practically regardless of the type of housing used by the small-volume producer.

## Labor and Management

Productivity of labor used in hog production in 1980, measured in terms of hours of labor per unit of production, increased in direct proportion to size of hog enterprise regardless of type of enterprise or geographic location. Operators with small enterprises spent about four times as many hours of labor per unit of production as did those with the largest enterprises (table 31).

Estimates of the annual use of labor for an enterprise are more accurate for large than for small enterprises when a survey is used. Most work in large hog operations is performed by hired workers who devote all their time to hog production year round. On farms with small hog enterprises, the operator and members of the farm family do most of the work. Activities are commonly divided among several farm enterprises, including hogs, thus

making accurate division of work done more difficult. Some family members whose hours are fully counted may not be capable of carrying a full workload. Even with such limitations placed against the reported use of labor in small hog operations, however, it is clear that their performance levels in 1980 were far below those of farms with larger enterprises.

The higher production per unit of labor in the larger operations has been made possible partly through a substitution of capital for labor. Farmers with small hog enterprises commonly use older buildings, sometimes built originally for another purpose, and rely heavily on field tractors for power. Such combinations of facilities involve substantial inefficiencies in terms of labor. Larger volume producers have invested in more highly specialized facilities designed to save labor and rely more heavily on electrically powered equipment.

Size of business, however, must be credited with much of the difference in labor productivity between small and large hog operations. In many respects, all producers used similar facilities and levels of mechanization in 1980. Virtually all producers

**Table 29—Pigs produced in 1980 per unit of nursery space, by type and size of hog enterprise and region, 1980<sup>1</sup>**

Size of enterprise (head)	Feeder pig production		Farrow-to-finish	
	North Central	Southeast	North Central	Southeast
<i>Pigs produced per unit of space</i>				
100 to 199	*	2.5	1.6	2.3
200 to 499	3.5	4.1	1.9	3.2
500 to 999	3.5	3.4	4.2	3.5
1,000 to 1,999	5.8	3.8	4.9	4.4
2,000 to 4,999	6.4	4.4	6.9	5.4
5,000 & over	9.2	5.0	5.6	7.4
All	4.5	4.1	4.6	4.7

\*No farms included in this category.

<sup>1</sup>Includes only farms that used nursery buildings.

**Table 30—Slaughter hogs produced in 1980 per unit of space in and growing-finishing buildings, by type and size of hog enterprise and region, 1980<sup>1</sup>**

Size of enterprise (head)	Farrow-to-finish		Feeder pig finishing	
	North Central	Southeast	North Central	Southeast
<i>Hogs produced per unit of space</i>				
100 to 199	1.4	2.5	0.7	0.9
200 to 499	1.3	1.7	1.5	1.1
500 to 999	1.7	1.7	1.8	1.8
1,000 to 1,999	2.0	2.6	1.9	1.7
2,000 to 4,999	2.3	2.4	2.7	2.4
5,000 & over	2.3	2.7	2.4	2.4
All	1.8	2.2	1.5	1.8

<sup>1</sup>Includes only farms that provided housing for hogs in their growing-finishing stage.

**Table 28—Litters of pigs produced in 1980 per unit of farrowing space by type and size of hog enterprise and region, 1980<sup>1</sup>**

Size of enterprise (head)	Feeder pig production		Farrow-to-finish	
	North Central	Southeast	North Central	Southeast
<i>Litters per unit of farrowing space</i>				
100 to 199	2.1	2.1	2.0	2.0
200 to 499	3.6	2.9	2.8	4.6
500 to 999	6.8	5.9	4.0	5.9
1,000 to 1,999	6.7	8.8	4.8	6.3
2,000 to 4,999	5.0	8.8	7.2	7.9
5,000 & over	11.2	14.3	8.4	8.6
All	4.3	5.9	3.9	5.3

<sup>1</sup>Includes only farms that used some type of farrowing facilities.

used some type of confinement facilities and powered equipment rather than hand labor for materials handling. Certainly, the differences in the production resources used by farmers with small versus large enterprises were not as great as the differences in labor productivity.

Producers in the Southeast generally reported higher inputs of labor per unit of production than did those in the North Central region. This relationship is the same as that recorded in 1975. Producers in the Southeast do most of their own hauling while those in the North Central region rely largely on custom operators. Otherwise, any advantage in terms of labor use apparently should lie with producers in the Southeast. They continue to discard most of their manure rather than use it on cropland as is the practice in the North Central region. Use of purchased complete rations and custom processing of feeds is more common in the Southeast than in the North Central region. Perhaps Southeast producers are still using more labor per unit of production simply because it is available in connection with seasonally labor-intensive crop enterprises and not because more is needed.

The kinds of labor used in hog production in 1980 were little different than in 1975 in general terms (19). Most work done in connection with hog production was still being performed by unpaid operator and family labor. In 1980, hired labor accounted for only 2 percent of the total hours of work put into feeder pig production, 7 percent of the amount for farrow-to-finish operations, and 14 percent of the total for feeder pig finishing (table 32). Overall, hired labor accounted for a larger proportion of labor in the Southeast, mostly because the larger hog enterprises accounted for a greater share of total hog production in the Southeast than in the North Central region.

Hired labor, nevertheless, played a substantially greater role in hog production in 1980 than indicated by its share of total hours. Producers with annual sales of 2,000 head or more hired much of the labor that they used in connection with hog production, especially in feeder pig production and farrow-to-finish opera-

tions. These larger operations accounted for nearly a fifth of total hog production in the North Central region; a third of the total in the Southeast. Their labor input per unit of hog production was a third or less than the amount used on farms producing fewer than 500 head of hogs per year (table 31). As hog production continues to shift toward larger operations, as it has in past years, hired labor, though likely remaining a small part of total labor, will be associated with an increasingly larger share of total hog production.

Management in hog production was still provided largely by unpaid farm operators in 1980. Managers were hired by only 1 percent of all operators, regardless of type of hog enterprise or geographic location (table 33). Hired management was used extensively, however, in the largest operations. Three-fourths of the largest feeder pig production units in the North Central region were run by hired managers, which reflects the high proportion of single-enterprise pig cooperatives or corporations established primarily to provide farmer members or contractors with pigs for finishing. From a third to nearly half of the largest farrow-to-finish enterprises were run by hired managers. Hired management was seldom used in pig finishing.

Annual compensation for persons classified as hired managers, including salaries, profit sharing, and all other items of value, typically ranged from \$13,000-\$16,000 on farms in the Southeast in 1980 (app. table 27). Compensation averaged \$18,000-\$23,000 on farms in the North Central region. Hired managers devoted almost all their time to hog production in feeder pig production and farrow-to-finish operations, but spent much of their time with other enterprises on farms that finished feeder pigs.

These results may indicate more hiring of managers and lower salaries than applicable to positions with full managerial responsibilities, especially for some of the farms with the smaller hog enterprises. Hired management can have responsibilities ranging from complete control of all phases of an operation, subject to periodic review by an owner or board of directors, to little more

**Table 31—Use of labor on hog enterprises, by type and size of hog enterprise and region, 1980<sup>1</sup>**

Size of enterprise (head)	Feeder pig production		Farrow-to-finish		Feeder pig finishing	
	North Central	Southeast	North Central	Southeast	North Central	Southeast
	-----Hours per litter-----				----- Hours per head-----	
100 to 199	24.8	36.8	33.4	34.8	1.5	2.0
200 to 499	19.2	31.9	26.0	26.6	1.1	1.3
500 to 999	17.0	23.3	17.0	22.3	.9	1.1
1,000 to 1,999	11.8	18.3	15.0	19.3	.6	.6
2,000 to 4,999	8.0	11.1	10.0	16.9	.4	.4
5,000 & over	6.5	7.2	9.9	11.3	.4	.3
All	16.2	21.6	19.4	22.9	.9	1.0

<sup>1</sup>Labor includes all time spent on work related to hog production, including buying of hogs and supplies and selling hogs. Time for maintenance of machinery, equipment, and facilities, and production and harvesting of feed crops, is not included. The hours devoted to hog production by hired managers are counted as hired labor in this summary.

than direction of daily activities. The 1981 survey did not impose a precise definition on hired management, relying instead on operators to classify employees according to their own concept of function. Some may have taken a liberal view of management and listed employees as managers, even though they only directed the daily activities of other workers, especially in the Southeast and on some farms in both regions where managers were reported as hired for small hog operations.

## Power and Energy

Producers with large hog enterprises had a much lower input of tractor and truck power per unit of production than did those with

small enterprises. Tractor power, whether measured in actual hours or horsepower hours per unit of production was drastically lower on large enterprises than on small (app. table 30). To some extent, this reflects extensive use of tractor-powered machinery in small enterprises while large enterprises relied more on electrically powered equipment. Mostly, however, reduced tractor power per unit of production represented a lower cost for the larger operations. All producers, regardless of size of enterprise, used tractor-powered equipment for handling manure. Larger volume producers who used electrically powered materials-handling equipment did not incur offsetting higher costs for electricity. In fact, electricity costs per unit of production were only slightly higher for the larger than the smaller operations.

**Table 32—Sources of labor in hog production, by type and size of hog enterprise and region, 1980<sup>1</sup>**

Size of enterprise and region	Feeder pig production			Farrow-to-finish			Feeder pig finishing		
	Operator	Unpaid family	Hired	Operator	Unpaid family	Hired	Operator	Unpaid family	Hired
<i>Percent of hours</i>									
North Central:									
100 to 199	9	11	0	78	19	3	78	15	7
200 to 499	65	35	*	68	26	6	55	23	22
500 to 999	61	35	4	64	26	10	61	20	19
1,000 to 1,999	62	37	1	51	26	23	53	15	32
2,000 to 4,999	59	22	19	34	39	27	56	23	21
5,000 & over	2	1	97	16	8	76	42	15	43
All	73	26	1	71	23	6	66	19	15
Southeast:									
100 to 199	91	5	4	79	8	13	64	35	1
200 to 499	74	17	9	71	20	4	68	12	20
500 to 999	60	33	7	54	23	23	66	18	16
1,000 to 1,999	49	25	26	47	16	37	46	11	43
2,000 to 4,999	42	13	45	26	14	60	46	13	41
5,000 & over	5	8	87	14	1	85	27	6	67
All	82	11	7	73	13	14	65	27	8
Both regions									
All sizes	76	22	2	71	22	7	66	20	14

\*Less than 0.5 percent.

<sup>1</sup>Labor includes all time spent on work related to hog production, including buying hogs and supplies, and selling hogs. Time for maintenance of machinery, equipment, and facilities, and production and harvesting of feed crops, is not included. The hours devoted to hog production by hired managers are counted as hired labor in this summary.

**Table 33—Hired managers in hog production, by type and size of hog enterprise and region, 1980<sup>1</sup>**

Size of enterprise (head)	Feeder pig production		Farrow-to-finish		Feeder pig finishing	
	North Central	Southeast	North Central	Southeast	North Central	Southeast
<i>Percent of farms</i>						
100 to 199	0	0	0	0	0	0
200 to 499	0	0	3	0	0	0
500 to 999	0	1	0	3	1	0
1,000 to 1,999	0	4	1	8	8	3
2,000 to 4,999	0	8	6	22	2	14
5,000 & over	76	0	36	46	10	14
All	*	1	1	1	1	1

\*Less than 0.5 percent.

<sup>1</sup>Hired managers were considered to be used in hog production if any of their time was devoted to hog production. The respondent determined whether an employee was a manager or hired worker.

Furthermore, when services that could have been performed with tractor power were bought on a custom basis, it was nearly always the small-volume producer who used the custom service, hence incurred cash expenses in addition to the tractor power used in the operation.

Truck use per unit of production followed the same pattern as tractor use. Both actual and ton miles per unit of production were much lower in the large operations than in the small (app. table 31). The apparent size economies were offset only to a small extent by custom hauling of hogs and pigs. This service was used by no more than a third of all producers in the North Central region and by less than 7 percent in the Southeast. Small-volume producers hired custom haulers with about the same frequency as large-volume producers.

Hog producers were dependent upon direct inputs of energy from a variety of sources in 1980. The relative importance of the different sources of energy, principally gasoline, diesel fuel, LP gas, and electricity, differed by type and size of enterprise, and especially between the two regions of production. Hence, adequate and timely supplies of all of the major kinds of energy were essential to operation of the systems of production in use.

Mobile equipment, including tractor-powered equipment and trucks, accounted for half or more of all fuels used in the average operation (table 34). Typically, gasoline was relatively more important than diesel fuel on farms in the North Central region than on those in the Southeast. Utility trucks of 1 ton or less in size were used by nearly all producers in both regions and accounted for much of the use of gasoline. Larger trucks, some of which used diesel fuel, were used infrequently, as producers commonly relied on small truck-trailer combinations or custom services for hauling.

Tractors were used in nearly all operations in the North Central region and in about three-fourths of those in the Southeast. The complement of tractor power used in hog production, however, was determined largely by the needs of the whole farm business. Seldom were tractors bought specifically for use in hog production. Annual use of tractors averaged over 500 hours per tractor in 1980, but less than a fourth of annual use was spent on hog production activities. Even in the largest hog operations, half of annual tractor use was spent for other enterprises.

Tractors manufactured in recent years have been mostly diesel units. Gasoline tractors, however, remain important in hog production, especially on farms in the North Central region where smaller and older tractors supply much of the power used in livestock production. In 1980, gasoline tractors accounted for two-thirds of total horsepower hours spent in feeder pig production, and one-third of the horsepower hours used in farrow-to-finish and feeder pig finishing operations (app. table 28). Diesel tractors supplied most of the power on farms in the Southeast.

Tractors using LP gas (liquefied petroleum) as a fuel were of little significance in hog production in either region.

On some farms with the larger hog enterprises, self-propelled skid loaders were used for handling manure. These machines are easier to use in and around buildings than are the ever larger field tractors and can do the job of tractors and loaders. In terms of fuel use, however, these machines accounted for only about 5 percent of the total on farms in the North Central region and less than 1 percent on farms in the Southeast.

Fuel use for mobile equipment was far less per unit of production in large operations than in small operations, regardless of type of hog enterprise or location of production. Only average fuel use is presented in this section as a guide to total industry needs, but fuel use per unit of production from operations of different sizes can be estimated from the input of tractor horsepower hours and truck ton miles (app. tables 30 and 31).

Hog producers also used substantial amounts of energy in 1980 for in-place services not involving mobile equipment or transportation. Electricity for all purposes, including heat, was an important category of energy use as were various kinds of fuels used for heating (table 34).

Pigs in the farrowing and nursery stages of production are adversely affected both by cold and temperature changes. Most producers, even those with the smallest enterprises, therefore provide supplemental heat. In 1980, most producers used either electricity or LP gas as their major source of heat. Electricity was used most often on farms in the Southeast; LP gas in the North Central region (app. table 29). Unit prices favored electricity in

**Table 34—Fuel and electricity use, by type of hog enterprise and region, 1980<sup>1</sup>**

Enterprise and region	Gasoline	Diesel fuel	Heating fuels	Electricity
----- Gal/litter -----				kWh/litter
Feeder pig production:				
North Central	8.7	1.9	10.1	196
Southeast	5.1	2.8	4.2	191
Farrow-to-finish:				
North Central	8.3	6.6	8.7	154
Southeast	7.2	7.7	4.3	237
----- Gal/head -----				kWh/head
Feeder pig finishing:				
North Central	1.6	1.4	0.2	10
Southeast	1.0	.6	.1	13

<sup>1</sup>Gasoline and diesel fuels include amounts used in tractors, trucks, and self-propelled machines. Farm use of autos is not included. The amount of heating fuels is an expression of total expenditures for such fuels, exclusive of electricity, in terms of LP gas. Use of electricity is for all purposes chargeable directly to hog production, including heating.

the Southeast, LP gas in the North Central region. Farmers used natural gas when possible, but it was available to few. Little use was made of other kinds of heating fuels. Solar housing was not used by any of the producers surveyed.

Use of electricity varied widely among farms, as producers chose different types of production systems, ways to mechanize materials handling, and alternatives to provide heat. Producers in the Southeast used as much electricity per unit of production (or more) as producers in the North Central region, largely because they relied more on electricity than on LP gas or other fuels to provide heat. Overall the mix of uses of electricity were such that unit inputs in terms of kilowatthours were near the same regardless of size of enterprise.

## Feedstuffs and Feeding

Feed accounted for half of the total cash outlay of the average feeder pig finisher in 1980, 60 percent of cash costs for pig producers, and 70 percent of cash costs in farrow-to-finish operations (20). In addition, much of the activity and other resources used in hog production involves acquiring feedstuffs, formulating them into mixes that meet the nutritional requirements of hogs in various stages of development, processing feedstuffs, and delivering rations to the hogs. Feed costs, although substantial, have been a gradually declining part of the total cost of hog production (which includes the overhead costs of depreciable assets and other noncash inputs as well as cash costs) as producers have adopted capital-intensive systems of production.

The basic nutritional requirements of hogs can be met with combinations of many different feedstuffs. However, the dominant feedstuffs used in hog production are grains and protein supplements. This section provides information on how hog producers acquired feeds, processed them, formulated rations, and distributed them to hogs in 1980. Pasture, though of minor importance in hog production in 1980, was still used extensively enough for breeding stock to warrant consideration.

## High-Energy Feeds

Grains, mostly corn, are the basic source of energy in hog rations. Traditionally, hog and grain production have been companion enterprises, with farmers using hogs as an alternative way to market grains and to use labor when not employed in crop production. To a large extent, hog and grain production remained together in 1980, but changes in technology, degree of specialization, size of enterprise, and location of hog production were beginning to separate them. Production of slaughter hogs in the North Central region still remained largely on farms that produced most of the grains fed to hogs in 1980. Nearly 90 percent of all grains used in farrow-to-finish and feeder pig finishing operations was produced on the same farms as the hogs (table 35). Corn accounted for about 90 percent of the acreage of all feed grains combined.

The largest producers of slaughter hogs in the North Central region showed the results of specialization. On average, they bought a third to half of the grain they used in hog production. Many still operated grain-hog farms, but some produced only hogs. The separation of grain and hog production was much greater in the Southeast, where grain production is less prevalent and totally specialized operations (particularly poultry) have been common for many years. Half or more of the grain fed to hogs in this region in 1980 was purchased. The largest hog producers depended almost completely on purchased grains.

Grain is important in the production of feeder pigs, but relatively less so than labor and production facilities, compared with the production of slaughter hogs. This is reflected in the smaller share of grain needs produced on such farms. Again, producers in the Southeast bought more feed grains than did those in the North Central region. Large-volume feeder pig producers had approached complete specialization in hog production in both regions, growing less than 10 percent of the grains that they fed to hogs in 1980.

Hogs can be fed either dry or high-moisture grains. Harvest can begin early, and the costs of drying are avoided, if grain is stored

Table 35—Grain fed to hogs that was produced on the farm where it was fed, by type and size of hog enterprise and region, 1980<sup>1</sup>

Size of enterprise (head)	Feeder pig production		Farrow-to-finish		Feeder pig finishing	
	North Central	Southeast	North Central	Southeast	North Central	Southeast
<i>Percent of grain</i>						
100 to 199	10	43	89	76	86	74
200 to 499	73	61	90	71	92	63
500 to 999	58	53	89	63	95	55
1,000 to 1,999	84	31	88	54	87	43
2,000 to 4,999	74	25	84	37	75	29
5,000 & over	5	8	53	17	63	8
All	61	38	86	55	88	46

<sup>1</sup>Includes all grain fed to hogs regardless of kind of ration or place of processing of feeds.



in high-moisture form. If properly ensiled in either sealed or nonsealed storage or preserved with an organic acid, high-moisture grains are suitable for hog feed and, on a dry-matter basis, are nutritionally equal to dry grain (3).

The storage and feeding of high-moisture grains to hogs poses different problems to hog producers than does the use of dry grain. High-moisture grains cannot be bought and sold in the regular grain markets, hence flexibility is reduced. Spoilage occurs rather quickly, especially in hot weather, so feeding systems must be designed accordingly. Perhaps a more serious concern, however, is that possible mold contaminations can reduce the palatability of feed and cause pregnant females to abort or absorb their pigs.

The disadvantages of high-moisture grains for hog feed apparently outweighed the advantages, as hog producers made little use of them in 1980. In the North Central region, high-moisture grains accounted for only 7 percent of the total grain used to grow slaughter hogs (app. table 32). They accounted for only a trace of total grain usage for hog feed in the Southeast. Feeder pig producers made virtually no use of high-moisture grains in either region.

Most farmers who did feed high-moisture grains to hogs used supplies stored primarily for cattle and also used some dry grain in their rations. Nearly all ground the grain and combined it with protein supplements into a complete feed, rather than offering the grain and supplement to hogs on a free-choice basis.

Hog producers may get part of their feed energy, even protein requirements, from a number of nontypical sources when supplies are available. Products that have been used include materials such as the residues from distilleries, whey left from the manufacture of cheese, and stale bakery products. Such feedstuffs, however, are important to only a few individual producers. Fewer than 1 percent of all producers reported the use of any amount of such unusual feedstuffs in 1980.

## High-Protein Feeds

Grains alone do not provide a balanced ration for hogs. Grains lack sufficient protein and other essential elements for hogs to grow efficiently. This is now universally recognized by producers. Virtually all producers supplemented grains with a high-protein feedstuff in 1980 (table 36).

To obtain balanced hog rations, the producer can purchase complete rations, including all essential ingredients, from a feed mill, or purchase either a commercially manufactured protein supplement or soybean meal, plus necessary additives, to combine with farm-grown grains. Properly balanced, high-quality feeds for hogs can be obtained through any of these options, the choice depending largely upon cost.

Corn usually contains less than 10 percent protein and lacks some elements essential to hogs. Balanced hog rations typ-

ically range from around 20 percent protein for small pigs to 13-14 percent for finishing rations, which account for the largest proportion of total feed used. For the industry as a whole, therefore, grains account for about 80 percent of the total amount of feed used and protein supplements for 20 percent. High-protein feedstuffs, however, are much more expensive than grains, so they sometimes approach half of total feed costs when price relationships strongly favor grain (20).

Producers may choose to purchase all the services of formulating rations as well as the feed ingredients or invest in equipment and include ration formulation as part of the hog enterprise. Generally, small-volume hog producers rely mostly on purchased commercial protein supplements or buy complete rations. Unless other livestock enterprises are present, the amount of feed will seldom justify investments in feed-processing equipment. Use of small quantities of soybean meal and the ingredients necessary to make it suitable for hogs usually allow no price advantages compared with commercial supplements. Further, small-volume hog producers may need the feed-related services often provided by feed companies such as delivery, credit, and counseling on management problems (2).

Overall, purchased commercial protein supplements accounted for slightly more than a third of all supplements used in feeder pig production in 1980 and about half in the production of slaughter hogs (table 36). They were a lesser part of the total in the Southeast and in all the larger enterprises (app. table 33). Large-volume feeder pig producers tended to specialize completely in the production of pigs with little feed production, so

**Table 36—Protein supplement for major hog ration obtained from selected sources, by type of hog enterprise and region, 1980<sup>1</sup>**

Enterprise and region	Source of protein supplement				
	Purchased commercial supplement	Soybean meal and mixing concentrate <sup>2</sup>	Soybean meal and separate additives <sup>3</sup>	Purchased complete ration <sup>4</sup>	Other
<i>Percent of supplement</i>					
Feeder pig production:					
North Central	38	24	2	36	0
Southeast	24	31	5	35	5
Farrow-to-finish:					
North Central	53	25	11	11	*
Southeast	41	35	10	14	0
Feeder pig finishing:					
North Central	52	27	6	15	0
Southeast	41	17	16	26	0

<sup>1</sup>Less than 0.5 percent.

<sup>2</sup>The major hog ration was the one representing the largest amount of feed fed. See appendix table 33 for data by size of enterprise.

<sup>3</sup>Soybean meal plus a purchased mixing concentrate (sometimes called a premix) containing necessary additives.

<sup>4</sup>Soybean meal plus salt, minerals, vitamins, and other ingredients purchased and added separately.

\*Protein supplement is part of a purchased complete ration.

most bought complete rations. The large producers of slaughter hogs relied heavily on soybean meal to balance their hog rations.

Soybean meal alone is inadequate for building a complete hog ration, but it can be used successfully if properly fortified with other essential ingredients (1). These ingredients can be purchased as a specially prepared mixture formulated for use with soybean meal, or producers can move one step further into ration formulation and buy the vitamins, minerals, and other ingredients individually.

Cost is the primary motivation for use of soybean meal rather than a commercial protein supplement. Considerable savings may be realized by using soybean meal, but normally only if the amount used is large enough to warrant purchase directly from a processor of soybean meal. From 1970-79, the retail price of complete 38-42 percent protein commercial hog feeds averaged only 9 percent above the retail price of soybean meal (16). This is not a sufficient price advantage for soybean meal to cover purchase of the necessary fortifying materials and pay the expenses for mixing them with the meal.

Average retail feed prices do not reflect the substantial discounts available to large-volume users. Over the same 10-year period, the retail price of soybean meal averaged 32 percent above the wholesale price at the processor (Decatur basis); the retail price of 38-42 percent commercial protein feeds for hogs was 42 percent above the wholesale price of soybean meal. Therein lies an opportunity for hog producers to cut costs by moving into more detailed formulation of hog rations using soybean meal as the protein base and purchasing it direct from a processor.<sup>9</sup>

Soybean meal can usually be bought from processors who offer it for sale to hog producers for the wholesale price plus about \$10 a ton if taken in bulk by the truck load. Ingredients necessary to supply the missing essentials for hogs in a corn-soybean meal ration cost around \$20 in recent years to fortify a ton of complete ration (grain and soybean meal combined) if purchased as a packaged concentrate or "premix"—somewhat less if bought in quantity as separate ingredients.

To produce a slaughter hog in a farrow-to-finish operation requires around 200 pounds of protein supplement. A farmer producing 200 hogs annually (and no other livestock) would need only one 20-ton truckload per year, hence has little chance to benefit from direct purchase of soybean meal and onfarm ration formulation. A 5,000-head producer, however, needs a large truckload of soybean meal nearly every other week. Integrating into feed manufacturing becomes much more of a feasible option for such large-volume users of feeds.

Direct use of soybean meal by producers in formulating their hog rations was substantially greater in 1980 than in 1975, when only a sixth of all producers (one-third of those with the largest hog enterprises) used soybean meal (19). In 1980, soybean meal accounted for a third of all protein supplements fed to hogs and exceeded three-fourths of the total for the largest volume farrow-to-finish producers in the North Central region.<sup>9</sup> Significant use was made of soybean meal in 1980 even by producers with small to midsized hog enterprises. In some cases, this may reflect an uneconomic choice, but farmers with small hog enterprises sometimes obtain the price advantages of high-volume use through a number of avenues—other livestock enterprises in addition to hogs, formal and informal buying groups, and sometimes simply providing input suppliers with enough total business to warrant favorable pricing of all purchases.

Commercial feeds accounted for a declining share of the total use of high-protein feeds in 1980 as the size of hog enterprises increased, but they were of substantial importance even on farms with the largest enterprises. This does not mean that such producers could have had a lower feed cost by using soybean meal. Large-volume purchases increase the bargaining power of the buyer. With sufficient volume, a hog producer may use more feed in a year than a small retailer sells, hence can deal directly with the feed manufacturer, essentially at the wholesale price level. The same factors apply when the choice is made to purchase a complete ration.

## **Feed Processing and Distributing**

Various feedstuffs were once made available to hogs separately and they ate what they wanted of each type of feed. Knowledge of specific nutritional requirements was limited; equipment for properly grinding and mixing feedstuffs was unavailable. Nutrition and ration formulation have now been developed to a high level of precision. Producers now seldom feed grains and protein supplements on a free-choice basis.

Nearly all the feedstuffs used in the production of slaughter hogs in 1980 were processed by some means into complete ground and mixed rations (table 37). Some small-volume hog producers still fed whole grains and protein supplements separately, but they handled only 1-2 percent of the feed used in the North Central region and 4 percent in the Southeast. More of the feeds used in feeder pig production, especially in the smaller operations, were fed as separate ingredients without processing, but this largely reflects the feeding of controlled amounts individually to females in the breeding herd (app. table 34).

Grains and commercial protein supplements can be fed on a free-choice basis, as the supplements are usually formulated so

<sup>9</sup>Price discounts may also be obtained by large-volume users of commercial supplements, but information on such discounts is unavailable.

<sup>9</sup>Soybean meal is also the major ingredient in most commercial hog supplement and commercially prepared complete rations, but these proportions apply to the direct use of soybean meal relative to commercial supplements.

as to inhibit excessive consumption. Even so, pigs are incapable of accurately balancing their diets if left to self-select ingredients. Soybean meal, however, which is quite palatable, must be combined into a complete ration to prevent the hogs from eating too much of it. The rapidly expanding producer use of soybean meal is a major factor in the almost complete shift from the feeding of ingredients separately to use of complete rations.

Basically, complete hog rations are prepared either by a commercial feed miller who performs the service for a fee or as part of the complete rations that the miller sells, or on the farm as an integral part of the hog enterprise. The size of the hog enterprise in association with other livestock enterprises and the diversity of the farm business largely determine whether feed processing is bought as a custom service or done on the farm as a part of the hog enterprise.

Feeder pig producers, regardless of size, relied heavily on commercial millers for complete feeds in 1980 (app. table 34). These producers use less feeds than do producers of slaughter hogs, and hence often cannot justify investments in feed-processing equipment. Also, they generally produce less of the grain that they feed to hogs. Custom millers produced about a fifth of the major rations used in slaughter hog production, commonly a higher proportion for the smaller volume producers than the larger ones, and they were generally more important in the Southeast than in the North Central region. Volume of feed used and associated grain production are again the determining factors.

**Table 37—Feedstuffs in major hog rations processed by selected methods, by type of hog enterprise and region, 1980<sup>1</sup>**

Enterprise and region	Method of feed processing			
	No processing	Tractor mill on farm	Electric mill on farm	Custom processed <sup>2</sup>
<i>Percent of feedstuffs</i>				
Feeder pig production:				
North Central	11	29	1	59
Southeast	13	37	8	42
Farrow-to-finish:				
North Central	2	60	21	17
Southeast	4	48	27	21
Feeder pig finishing:				
North Central	1	62	15	22
Southeast	4	37	22	37

<sup>1</sup>The major ration is the one accounting for the largest part of total feeds fed to hogs. See appendix table 34 for data by size of enterprise.

<sup>2</sup>Custom processing includes the processing of farm-grown or purchased grains for a fee either at the farm or the custom mill and the processing of purchased complete rations.

Onfarm feed-processing systems accounted for most of the complete rations prepared for use in the production of slaughter hogs in 1980, especially in the North Central region. Volume of feed used is substantial, a major part of total grains fed to hogs is produced on the same farms, and soybean meal is often chosen as the source of protein for building complete rations. All three factors increase the economic feasibility of onfarm feed-processing systems as opposed to commercial milling.

Basically, onfarm feed-processing systems are built around either tractor power and mobility for feed distribution or electrically powered equipment, which commonly involves a high level of mechanization in the total feed-processing and distribution system. Tractor-powered mills, mostly mobile grinder-mixers that grind, mix, and deliver hog rations, were used to process over 60 percent of the feedstuffs used by slaughter hogs in the North Central region in 1980. These mills, typically costing \$6,000-\$9,000 in 1980, are ordinarily powered by tractors of about 100 horsepower, which are commonly available on the grain-producing farms of the region. Further, they can be used to service other types of livestock on the same farm, particularly cattle feedlot operations. Much less use was made of tractor mills in the Southeast for the reverse of the same reasons: Southeast hog farmers are generally more specialized in hogs and produce less grain and therefore have less tractor power available.

When producers specialize in hog production, electrically powered feed-processing systems are a common choice, especially in the larger operations (app. table 34). In essence, such producers build a feed-manufacturing plant to suit the needs of their hog enterprise. Investments range from a few thousand dollars upward. Such systems are usually designed to: draw various ingredients from storage; measure, blend, grind, and mix them; and deliver rations directly to the hogs. Accuracy in ration formulation and minimization of labor are major objectives. Other livestock enterprises are seldom involved. In 1980, over 80 percent of the feeds processed and fed by the largest volume farrow-to-finish operators in the North Central region were handled this way. Nearly 90 percent of these same farmers employed electrically powered feed-conveying systems, many of which were designed to move feeds via high-pressure air (app. table 35). Such highly mechanized electrically powered milling and distribution systems were also in widespread use in other large operations in both regions, but accounted for a smaller part of the total.

Tractor-powered grinder-mixers were basic to the mobile feed processing and distribution systems in use in 1980; electrically powered units characterized the stationary systems. Hog producers, however, still used a wide variety of feed-handling equipment, often involving several different types of equipment on the same farm (app. table 35). Some still processed a part of



Large-volume producers commonly buy truckloads of soybean meal direct from processors (above). The soybean meal forms the protein base for hog rations. The soybean meal is mixed with grains (mostly corn) and other essential ingredients, often in a central feed-processing system, like the one shown at right, to form a complete balanced ration. Many hog producers still use tractor-powered mobile grinder-mixers, but the trend, especially for larger operations, is toward electrically powered centers like the one shown here.



their hog feed on the farm even though the major hog ration was purchased or custom processed. Larger volume of feed use through other livestock enterprises in addition to hogs often permitted use of types of equipment that a small hog enterprise would not justify. On the other hand, diverging needs of multiple enterprises sometimes forced farmers to invest in duplicate services. Producing hogs at more than one site, in scattered buildings or use of both confinement and pasture methods of production often required mobile equipment even though most of the hogs were serviced by a stationary system. Redundancy in feed processing and distributing equipment often occurs in separate preparation of medicated and nonmedicated feeds to prevent potential drug residues in slaughter hogs.

Feed-milling equipment is subject to a high rate of wear and also rapid obsolescence as enterprises are enlarged, especially if expansion also involves a change in the basic system of production for hogs. Nearly half of the feed mills in use in 1980 had been purchased as new equipment during the latter half of the 1970's (table 38). Partly, this reflects investments by farmers who entered hog production during that period, but replacement and upgrading of equipment accounted for most of the recent purchases. These investments included both mobile grinder-mixers and stationary electric mills with emphasis on the latter, especially for the larger operations. The age distribution of feed-milling equipment was essentially the same regardless of type or size of hog enterprise or geographic location.

The age of equipment used for the distribution of feeds to hogs clearly indicates the strong shift toward semiautomation of complete feed-handling systems through the use of electrically powered equipment. Tractor-drawn self-unloading feed wagons and trucks were still in common use in 1980, but only a sixth of all such equipment had been purchased during 1975-80; well over half was 10-20 or more years old (table 38). In contrast, two-thirds of the electrically powered feed-conveying systems had recently been installed. Such systems mesh well with electrically powered feed mills and move feed in a continuous flow process from ingredient storage through milling and to the feeding area. A number of mechanical devices may be used to move feed, but newly constructed systems, especially those in the larger and more specialized hog operations, commonly moved feeds via high-pressure air in relatively small diameter pipes laid underground from a feed-processing center to supply tanks at each hog building.

### Use of Pastures

Pastures are no longer essential in hog production either as a means for supplementing grains or for providing an environment free of diseases and parasites for hogs. Use of pastures has continued to decline as producers move their operations into confinement facilities. The proportion of farms on which pastures were used for hog production in any way dropped by nearly half between 1975 and 1980 (19).

Use of pastures differed substantially by geographic region in 1980. Only about a third of the farmers with feeder pig production and farrow-to-finish enterprises in the North Central region made any use of pasture (table 39). Though pastures were still relatively common on farms with smaller hog operations, they

were seldom used on farms with the larger enterprises. Nearly all feeder pig finishing operations in the North Central region were carried out in confinement with no use of pasture. In the Southeast, a much higher proportion of producers used some pasture with all types of hog enterprises. The larger volume operations, however, were mostly in confinement as in the North Central region.

Pastures as presently used in hog production serve primarily as either a site for production or a holding area for breeding animals. Only the smallest hog enterprises had pasture acreage sufficient for a potentially significant contribution to the feed supply (table 39). Good quality legumes stocked at the rate of 10-20 pigs per acre can contribute to a feeding program, but much of the pasture used on farms in 1980 was at a rate of 3 acres or less per 100 head of annual sales. This generally indicates use of pastures for breeding animals only.

The low-quality pastures used in hog production in 1980 further indicate that they were seldom intended as a source of feed. Nonillable pastures and woodland provided a large part of the total acreage of pastures in the Southeast in 1980 (table 40). Such pastures provide little more than space for hogs and thereby substitute only for housing. Crop residues, primarily corn after harvest, accounted for much of the acreage used for hog pasture in the North Central region. Crop residues are available briefly in the fall, hence their contribution to hog production either as feed or site of production is limited. Overall, the small amount of pasture per animal, the small proportion of

**Table 38—Period of manufacture of major categories of feed processing and distribution equipment used in hog production, 1980<sup>1</sup>**

Type of equipment	Before 1960	1960-69	1970-74	1975-79	1980
<i>Percent of machines</i>					
Feed mills <sup>2</sup>	3	23	28	43	3
Mobile feed distribution equipment <sup>3</sup>	27	33	24	16	*
Electrically powered feed distribution systems <sup>4</sup>	1	14	23	57	5

\*Less than 0.5 percent.

<sup>1</sup>Machines are given equal weight without regard to size or values in determining the age distribution.

<sup>2</sup>Includes all types of portable and stationary feed mills.

<sup>3</sup>Includes tractor-drawn self-unloading feed wagons and trucks used to haul feed to hogs.

<sup>4</sup>Includes all types of electrically powered conveying systems for moving feed from a receiving or processing center to hog-feeding locations.

**Table 39—Pasture use in hog production by type and size of hog enterprise and region, 1980<sup>1</sup>**

Pasture use and size of enterprise (head)	Feeder pig production		Farrow-to-finish		Feeder pig finishing	
	North Central	Southeast	North Central	Southeast	North Central	Southeast
<i>Percent of producers</i>						
Producers using pasture:						
100 to 199	0	64	29	76	0	34
200 to 499	51	49	35	63	28	66
500 to 999	55	50	56	64	3	33
1,000 to 1,999	38	45	54	60	3	18
2,000 to 4,999	44	46	19	18	9	9
5,000 & over	0	31	13	8	0	4
All	33	56	37	68	12	43
<i>Acres per 100 head<sup>2</sup></i>						
Pasture use:						
100 to 199	*	8.9	16.4	16.9	*	14.9
200 to 499	21.0	4.6	9.6	11.8	2.3	5.3
500 to 999	4.0	5.3	3.9	3.7	.7	1.9
1,000 to 1,999	1.8	1.7	6.4	2.9	2.5	.6
2,000 to 4,999	.6	.8	1.8	2.3	7.7	1.9
5,000 & over	*	.2	1.3	1.4	*	.2
All	8.4	4.4	6.7	9.1	3.0	5.6

\*No pasture used on any farms.

<sup>1</sup>Farms were credited with the use of pasture in hog production if any was used for any hogs of any kind.

<sup>2</sup>Includes all kinds of pastures, but only farms on which some pasture was used in hog production.

pasture in legume crops, and the rapidly declining proportion of producers that make any use of pastures have essentially removed pastures as a factor for consideration in commercial hog production. Developments in breeding, housing, and management technologies have already made it practical for the best managers to handle breeding animals as well as other types of hogs in confinement without the use of pasture.

## Production Facilities

Until not too long ago, hog production was scheduled largely according to weather conditions and periods when labor was not needed in crop production. Hogs were provided with a minimum of shelter and kept on pasture. Some are still produced that way, but in most operations, housing has become one of the most specialized and costly parts of hog production.

Early attempts to move hogs off pasture and into intensified production systems failed because of an inability to control diseases and parasites and inadequate nutrition. When these problems were brought under control, starting largely in the early 1950's, producers began to shift rapidly to intensive systems of production using various types of housing rather than extensive pasture systems. Advances in technology made the shift to intensive production systems possible. A number of economic factors fostered the move, including more profitable alternative uses for land, a desire to increase production per worker through mechanization of materials handling, and the ability to produce hogs year round.

Types of housing and combinations of housing for hogs have undergone numerous changes as a result of research findings and producer experience. Change still continues. Major efforts

have been aimed at improving the overall materials-handling system, providing optimal environments for hogs at each stage of their development, and managing hog wastes, which have become an increasing problem as size and concentration of hog enterprises have expanded.

In 1980, hog producers were using specialized housing for up to five different phases in the life cycle of hogs. These included housing for breeding animals, facilities to care for sows during gestation, farrowing quarters, nurseries for pigs after weaning, and housing for hogs during their growing and finishing period. The following description of production facilities reveals the level of technology in use in 1980, especially with regard to the degree of confinement and designs for handling hog wastes. Types, amounts, and ages of housing reveal the general level of investment that has been committed to hog production, the probable condition of facilities, the capacity for future production, the companion resources that can or must be used in the operations, and the potential for change as more effective technologies are discovered.

A confinement system of production is commonly thought of as characteristic of modern hog production. Confinement, however, is a term that has carried different meanings and has caused confusion and misunderstanding. Most hogs are produced in confinement in the broad meaning of this term, that is, they are in centralized facilities rather than in fields. On the other hand, few operations keep all hogs totally enclosed within buildings. Some problems are still associated with raising hogs in confinement: for example, females in heat can be difficult to detect and some animals develop problems with their feet and legs because of standing on concrete floors all the time. Animal scientists believe, however, that eventually these problems can be overcome by continuing to select the most adaptable animals.

In 1980, virtually none of the operations that involved breeding animals operated in total confinement except for those that had specialized most completely in hog production and had annual sales of 5,000 head or more (table 41). Typically, the breeding animals had access to exposed lots or pasture even when all other phases of production were carried out in fully enclosed buildings. Total confinement was most common in feeder pig finishing operations where breeding animals were not involved, especially in the larger enterprises, but overall only 4 percent of these farms operated in total confinement.

## Farrowing Facilities

The farrowing facility is the key building in operations that produce pigs either for sale as feeder pigs or to be finished for the slaughter market on the same farm. Without adequate farrowing facilities, pigs can be produced only seasonally, losses of pigs

**Table 40—Type of pasture used in hog production, by type of hog enterprise and region, 1980**

Enterprise and region	Nontillable pasture or woodland	Legumes or grasses on tillable land	Young small grains	Crop residues	Other
<i>Percent of acres</i>					
Feeder pig production:					
North Central	7	6	0	87	*
Southeast	36	55	*	9	0
Both	11	12	*	77	*
Farrow-to-finish:					
North Central	37	20	*	43	0
Southeast	46	20	11	23	*
Both	39	20	2	39	*
Feeder pig finishing:					
North Central	33	51	0	16	0
Southeast	57	12	26	5	0
Both	44	34	11	11	0

\*Less than 0.5 percent.

are often high, and a large amount of labor is needed to care for the sows and pigs.

In 1980, only 6-8 percent of all pigs were farrowed with no shelter for the sows and litters (table 42). Nearly all of these were produced on farms with small enterprises where farrowing occurred seasonally in warm weather (app. table 36). Portable housing provided the shelter for about 10 percent of production, nearly all of which was in the North Central region where some pasture production systems are still in use, especially in northwestern Illinois and parts of Iowa. These pasture systems also operate seasonally in conjunction with crop production. Many farms that produced pigs without shelter or with portable housing in 1980 had either entered or expanded production in response to the favorable returns during 1977-79. The long-term trend for farrowing without central farrowing houses continues downward.

Over four-fifths of all pigs produced in 1980 were farrowed in central houses (table 42). In the midsize and larger operations, virtually all pigs were produced in central farrowing houses (app. table 34). Such houses are commonly designed to meet two major objectives—providing a suitable environment for producing pigs year-round and reducing the amount of labor required to care for the sows and pigs. A feature greatly affecting both, especially the need for labor, is the arrangement for cleaning the building and handling manure.

For many years, central farrowing houses were designed with solid concrete floors. Only a few are still being constructed that way. The pressure to cut labor requirements in farrowing has fostered an increasing use of various types of self-cleaning floors. Slotted floors constructed over storage pits for manure were most common on farms in 1980 (table 42). Nearly a fourth



**Sow and litter in farrowing crate in central farrowing house. Sow farrows and remains here with litter until pigs are weaned (4-6 weeks old). Floors are self-cleaning. House is heated and ventilated to provide ideal conditions for baby pigs. Large litters, healthy pigs, early weaning, and intensive use of high-cost facilities are essential to the success of large confinement operations.**

**Table 41—Farms producing hogs in total confinement, by type and size of hog enterprise and region, 1980<sup>1</sup>**

Size of enterprise (head)	Feeder pig production		Farrow-to-finish		Feeder pig finishing	
	North Central	Southeast	North Central	Southeast	North Central	Southeast
<i>Percent of farms</i>						
100 to 199	0	0	0	0	2	0
200 to 499	3	0	*	0	3	4
500 to 999	0	0	0	0	4	8
1,000 to 1,999	0	0	0	1	14	19
2,000 to 4,999	0	1	1	9	14	33
5,000 & over	13	38	16	20	21	35
All	1	*	*	*	4	4

\* Less than 0.5 percent.

<sup>1</sup>Total confinement here means that all hogs and pigs are kept in totally enclosed buildings with no access to outside space. Farms use no pasture, no portable shelters, and no paved lots. Information is not available to determine whether buildings are screened to exclude birds, but this is unlikely, particularly in the smaller operations.

**Table 42—Pigs produced on farms by type of farrowing facility, type of hog enterprise and region, 1980<sup>1</sup>**

Enterprise and region	Type of farrowing facility						Mixed types of housing <sup>2</sup>
	Only central farrowing houses with:						
	None	Portable only	Paved floors	Slotted floors	Flush system	Scrape system	
	Percent of pigs						
Feeder pig production:							
North Central	6	13	18	16	4	17	26
Southeast	8	0	49	24	9	3	7
Both regions	6	11	23	18	5	15	22
Farrow-to-finish:							
North Central	7	10	38	23	2	1	19
Southeast	16	4	35	27	7	1	10
Both regions	8	10	37	24	3	1	17

<sup>1</sup>See appendix table 36 for data by size of enterprise.

<sup>2</sup>Includes pigs produced on farms with more than one type of farrowing facility, mostly central farrowing houses with different types of floors.

**Table 43—Types of floors in central farrowing houses, by type of hog enterprise and region, 1980**

Enterprise and region	Paved	Partly slotted	Fully slotted	Flush gutter (open)	Flush gutter (covered)	Scrape gutter (open)	Scrape gutter (covered)	Dirt	Other
<i>Percent of capacity</i>									
Feeder pig production:									
North Central	45	11	7	1	3	23	**	**	10
Southeast	65	7	6	4	2	8	**	8	**
Both regions	50	10	7	2	3	19	**	2	7
Farrow-to-finish:									
North Central	68	10	11	1	2	*	1	2	5
Southeast	59	17	9	4	3	*	*	6	2
Both regions	67	11	11	1	2	*	1	2	5
All farrowing capacity	62	11	10	1	2	5	1	2	6

\* Less than 0.5 percent.

\*\* No farms included in this category.

**Table 44—Farrowing houses by date of construction, type of flooring, type of hog enterprise, and region, 1980<sup>1</sup>**

Enterprise and region	Before 1950	1950-59	1960-69	1970-74	1975-79	1980
<i>Percent of capacity</i>						
Feeder pig production:						
North Central	11	4	8	22	53	2
Southeast	3	*	42	11	40	4
Both regions	9	3	18	19	49	2
Farrow-to-finish:						
North Central	30	7	22	11	26	4
Southeast	3	3	30	21	38	5
Both regions	27	6	24	12	27	4
All farrowing houses	22	5	22	14	33	4
Type of flooring: <sup>2</sup>						
Paved floor buildings	31	8	27	14	18	2
Slotted floor buildings	1	0	9	19	67	4
Buildings with flush or scrape cleaning units	3	*	6	9	71	11

\* Less than 0.5 percent.

<sup>1</sup>Includes all types of central farrowing houses regardless of type of floor. See appendix table 38 for data by size of enterprise. Date of construction is defined as the year built or the year of last remodeling equivalent to one-third or more of the cost of new construction.

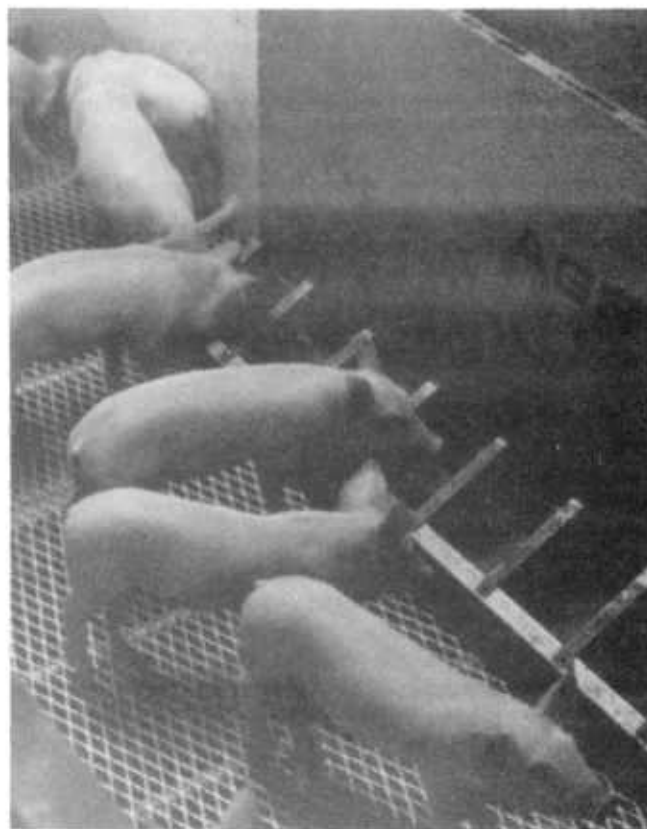
<sup>2</sup>Includes central farrowing houses in both the North Central and Southeast regions in feeder pig production and farrow-to-finish enterprises.



of all pigs were produced in such buildings that year, and the larger operations produced more than half of their pigs in central farrowing houses of this design (app. table 36). Newer central farrowing houses have included cleaning systems for flushing, draining, or mechanically scraping manure from beneath the hogs into outside storage facilities. Most commonly, slotted floors are still used over the area to be flushed, drained, or scraped, but the open space beneath the hogs is greatly reduced, thereby lessening the cost of heating the building. Such systems are relatively new and provided farrowing quarters for only a small percentage of total production in 1980, being most prominent in the larger operations with newly constructed facilities.

The capacity for farrowing in central housing in 1980, that is, the number of sows and litters that could be cared for at one time, was distributed differently than the actual production of pigs. Solid-floor housing accounted for over 60 percent of the total capacity, with slotted floor housing second at 21 percent (table 43). All other types of central farrowing houses held minor percentages of the space available for producing pigs. Large operations, however, were mostly equipped with one of the several types of houses with self-cleaning floors (app. table 37). As size of enterprise has increased, producers have invested in the more labor- and energy-efficient types of housing that can be used much more intensively year round.

The pattern of construction of central farrowing houses over time indicates the trend in types of housing, the investment activity of producers with different sizes of enterprises, and the status of farrowing facilities existing in 1980. As a group, producers invested heavily in central farrowing houses during 1975-80. Over half of the total capacity used in feeder pig production and one-third of that used in farrow-to-finish enterprises was built during that period (table 44). Only during the 1960's was this amount of construction approached. On farms



Young pigs are often placed in a nursery like this one after weaning until they reach 40-60 pounds. This nursery is equipped with a feeder that is filled automatically and self-cleaning floors. When pigs reach 40-60 pounds, they are either sold to a feeder-pig finishing operation (in a split-phase production scheme) or are moved to growing-finishing housing (in a farrow-to-finish operation) where they are fattened for slaughter.

**Table 45—Pigs produced on farms using specified types of nursery facilities, by type of hog enterprise and region, 1980**

Enterprise and region	Type of nursery <sup>1</sup>						
	None	Paved floor only	Slotted floor only	Flush system only	Scrape system only	Mixed self-cleaning floors	Other
Percent of pigs							
Feeder pig production:							
North Central	41	15	42	1	*	*	1
Southeast	43	21	27	7	0	0	2
Both regions	41	16	40	2	*	*	1
Farrow-to-finish:							
North Central	60	9	29	1	1	*	*
Southeast	56	12	23	6	*	1	2
Both regions	60	9	29	1	*	*	1

\*Less than 0.5 percent.

<sup>1</sup>Farms with nursery facilities are divided according to the type of floor in the nursery buildings, including farms with nurseries with only one type of floor and those with mixed self-cleaning systems. The last category includes farms with nurseries with mixed floor types not previously specified. See appendix table 39 for data by size of enterprise.

with the larger hog enterprises, well over half of all capacity in central farrowing houses was constructed during 1975-80, and few such producers had farrowing facilities older than 10 years (app. table 38). Producers, especially those with the larger hog enterprises, thus began the 1980's with relatively new farrowing facilities, many of which had self-cleaning floors.

Farrowing houses equipped with flush, drain, or scrape units for cleaning represent one of the newest technologies in housing. Over 80 percent of the capacity existing in such housing in 1980 was in units constructed in the latter half of the 1970's; 91 percent of the total capacity was in buildings no more than 10 years old (table 44). Farrowing houses with slotted floors built over pit storage for manure were also relatively new. Seventy-one percent of the total capacity of such housing was built during 1975-80, only 10 percent prior to 1970, even though this waste management system was well known much earlier.

Farmers continued to build some solid floor central farrowing houses throughout the 1970's, despite their disadvantages relative to the self-cleaning types of buildings.<sup>10</sup> Only a fifth of the total capacity of solid floor housing was constructed during 1975-80, but this is a significant amount because solid floor farrowing houses accounted for over 60 percent of the farrowing capacity in use in 1980 and about 40 percent of pigs produced in central farrowing houses.

### Pig Nurseries

When hog producers farrowed only a few times a year, there was little need for nurseries—houses designed to provide the best

<sup>10</sup>Such construction likely reflects remodeling of old buildings to a greater degree than construction of new ones. Date of construction was defined as the year built or the year of last remodeling costing one-third or more of the cost of a new building.

conditions for pigs for the first month or so after weaning. Pigs could be kept in the farrowing facilities until ready to go on a growing-finishing program. As producers developed larger and more specialized enterprises, they intensified their farrowing schedules. To maximize annual production per sow and to get as much production as possible from expensive farrowing houses, producers weaned pigs earlier, commonly at 4 weeks of age or less. Weaning is a stressful time for pigs, so specialized nursery buildings were developed to ease the transition between weaning and the growing-finishing stage.

In 1975, nursery buildings were used with 30 percent of the pigs produced in farrow-to-finish operations and 40 percent of those sold as feeder pigs (19). Five years later, these proportions had increased to 40 and 59 percent, respectively (table 45). In 1980, nearly all producers with the largest enterprises had incorporated nurseries into their program (app. table 39).

Producers have chosen self-cleaning floors for nursery buildings more often than for any other type of hog housing. Only one-sixth of the total capacity of nurseries in use in 1980 was in solid floor buildings requiring use of labor for cleaning (table 46). Over three-fourths of all nursery capacity was in buildings equipped with slotted floors (usually totally slotted floors) over pit storage for manure. The more recently developed systems for cleaning by flushing, draining, or mechanically scraping manure from beneath the pigs into outside storage had been installed in only a small portion of total nursery space.

Nearly all nursery buildings in use in 1980 were built in the 1970's. Three-fourths or more of all nurseries equipped with the various types of self-cleaning floors were built during 1975-80 (app. table 40). Much of the housing with paved floors was in older buildings, often constructed initially for other purposes and converted to shelter for pigs.

Table 46—Type of flooring in nursery buildings, by type of hog enterprise and region, 1980<sup>1</sup>

Enterprise and region	Paved	Partly slotted <sup>2</sup>	Fully slotted <sup>2</sup>	Flush gutter (open)	Flush gutter (covered)	Scrape gutter (open)	Scrape gutter (covered)	Dirt	Other
<i>Percent of capacity of nursery buildings</i>									
Feeder pig production:									
North Central	24	33	38	0	2	*	3	0	0
Southeast	24	15	37	15	4	0	0	5	0
Farrow-to-finish:									
North Central	11	21	65	1	1	1	*	0	0
Southeast	23	16	42	8	5	0	*	5	1
All types, all regions	16	22	55	2	2	1	1	1	*

\*Less than 0.5 percent.

<sup>1</sup>Type of flooring in nursery buildings was not related to size of enterprise except that solid concrete was the dominant type on farms with the smallest enterprises; slotted floor units on farms with the largest.

<sup>2</sup>Over pits for storage of manure.

### Growing-Finishing Buildings

Growing and finishing is the third and final phase of preparing hogs for the slaughter market. It is the end of the production sequence in farrow-to-finish operations; it is the sole activity on farms that buy feeder pigs for finishing. At this stage of their development, pigs are able to withstand more stress and a wider range in environment than when they are younger. Producers therefore have been able to use a much wider range of production facilities than during the farrowing and nursery periods when most shelter is provided in fully enclosed buildings.

Some hogs were still being finished in the open without shelter in the North Central region in 1980, but these were mostly on smaller enterprises that operated seasonally. Most hogs were provided with some type of shelter, particularly on farms that specialized in the purchase and finishing of feeder pigs (table 47). Finishing hogs without shelter buildings was much more common in the Southeast, accounting for over a third of all hogs produced in farrow-to-finish operations, a fifth of the total from farms that only finished pigs.

Three basic types of housing units were in use in 1980 for sheltering hogs during the growing and finishing period. Open-front buildings designed to permit hogs free access to shelter were used to house about 25 percent of all slaughter hogs produced in the North Central region and over 40 percent of the total in the Southeast. Fully enclosed buildings, either with or without access for the hogs to open lots, were used extensively by producers in the North Central region for added protection from severe winter weather. Enclosed buildings combined with open lots were usually older structures, often converted to shel-

ter for hogs from some other purpose. Enclosed buildings were less important than open-front buildings in the Southeast where the milder climate permitted use of the more economical open buildings. Producers with the larger enterprises, however, most often used totally enclosed housing without open lots for shelter of hogs during their growing and finishing phase regardless of geographic location (app. table 41).

Open-front buildings accounted for over 40 percent of the total space available in 1980 for housing hogs during their growing-finishing stage (table 48). This is considerably greater than the proportion of hogs finished in these facilities. Typically, open-front buildings were on farms with the smaller enterprises and many received only part-time use. The much more expensive enclosed buildings accounted for a smaller share of total capacity than of production, because they were used more intensively. Enclosed growing-finishing buildings accounted for most of the housing capacity on farms with the larger operations (app. table 42).

Efforts to simplify the management of hog wastes produced in confinement buildings have been extended into the design of housing for growing and finishing of hogs almost to the same extent as in other phases of hog production. About 40 percent of all hogs finished in confinement systems in 1980 used housing with slotted floors or flushing or scraping systems, primarily the former (table 49). Producers with the largest operations used buildings with some type of self-cleaning floor for up to 90 percent of their production (app. table 43).

Existing capacities of all housing for growing and finishing of hogs were distributed according to floor types about the same as actual production in 1980 (table 50). The proportion of housing capacity with slotted floors and other self-cleaning systems had nearly doubled compared with 1975 (19). Most of the build-

**Table 47—Type of housing for growing and finishing hogs, by type of hog enterprise and region, 1980<sup>1</sup>**

Enterprise and region	No housing	Open-front building	Fully enclosed building without access to lot	Fully enclosed building with access to lot	Mixed <sup>2</sup>
<i>Percent of hogs</i>					
Farrow to finish:					
North Central	14	24	21	23	18
Southeast	35	41	18	2	4
Both regions	16	26	21	21	16
Feeder pig finishing:					
North Central	5	31	10	22	32
Southeast	20	42	19	8	11
Both regions	7	33	11	20	29

<sup>1</sup>See appendix table 41 for data by size of enterprise. Floors may be of any kind. Open-front buildings are usually associated with open lots. Farms without permanent housing may have provided hogs with some shelter in portable facilities.

<sup>2</sup>Housing on farms with two or more types of housing.

**Table 48—Capacity of housing for growing and finishing hogs, by type of housing and type of hog enterprise and region, 1980<sup>1</sup>**

Enterprise and region	Open-front building	Fully enclosed building without access to lot	Fully enclosed building with access to lot
<i>Percent of housing capacity</i>			
Farrow-to-finish:			
North Central	41	32	27
Southeast	67	32	1
Both regions	42	32	26
Feeder pig finishing:			
North Central	37	29	34
Southeast	49	44	7
Both regions	38	31	31

<sup>1</sup>See appendix table 42 for data by size of enterprise.

ing capacity on the larger hog operations had self-cleaning floors in 1980 (app. table 44). Most of the housing capacity in the largest operations was equipped with slotted floors, but some farms, especially in the Southeast, used flushing systems.

The time pattern of construction of growing and finishing facilities was similar to that for other types of housing. Construction of buildings with solid floors was distributed rather evenly over the 30 years prior to 1980 (table 51). Well over half of the total capacity of buildings with self-cleaning floors, however, was constructed during 1975-80. Only a small proportion of these buildings was more than 10 years old.

Overall, a high proportion of the housing that producers were using for growing and finishing of hogs in 1980 was of recent construction, especially in the Southeast where over half of total capacity was constructed during 1975-80 (app. table 45). Pro-

ducers with the larger enterprises had been especially aggressive investors, typically having built three-fourths or more of all finishing facilities in use in 1980 during the previous 10 years with construction heaviest in the latter part of the 1970's. For all the major housing facilities combined, including central farrowing houses, nurseries, and growing-finishing houses, hog producers entered the 1980's with a higher proportion of newer facilities than in any previous period.

### Housing for Breeding Hogs

Most hog producers managed their breeding hogs on an extensive basis in 1980, keeping them on pasture or in open lots. Housing seldom represented a major investment except on farms with the largest enterprises where approximately half of all breeding animals were kept in centralized facilities, mostly fully enclosed buildings that did not allow hogs access to outside lots.

**Table 49—Type of flooring in growing-finishing buildings, by type of hog enterprise and region, 1980<sup>1</sup>**

Enterprise and region	Paved floor	Slotted floor	Flush system	Scrape system	Mixed paved and self-cleaning floors	Dirt floor	Other
<i>Percent of hogs</i>							
Farrow-to-finish:							
North Central	56	26	2	1	10	4	1
Southeast	46	32	12	1	2	6	1
Both regions	54	25	4	1	10	5	1
Feeder pig finishing:							
North Central	51	15	*	0	21	8	5
Southeast	48	18	10	0	7	7	10
Both regions	51	15	1	0	20	8	5

\*Less than 0.5 percent.

<sup>1</sup>Excludes hogs finished on farms which provided no shelter in permanent buildings. Slotted floor units are constructed over pit storage for manure and may have partially or fully slotted floors. Flush and scrape systems are designed to remove manure by flushing or scraping of the floors. The last column includes combinations of floor types not specified.

**Table 50—Capacity of housing for growing and finishing hogs, by type of flooring, type of hog enterprise, and region, 1980<sup>1</sup>**

Enterprise and region	Paved	Partly slotted	Fully slotted	Flush gutter (open)	Flush gutter (covered)	Scrape gutter (open)	Scrape gutter (covered)	Dirt	Other
<i>Percent of capacity</i>									
Farrow-to-finish:									
North Central	58	16	19	*	1	*	2	3	1
Southeast	48	15	19	11	2	1	*	4	0
Both regions	57	16	19	1	1	*	2	3	1
Feeder pig finishing:									
North Central	62	24	8	1	1	0	0	3	1
Southeast	50	12	15	5	8	0	0	10	0
Both regions	61	24	9	1	1	0	0	3	1
All housing	58	18	16	1	1	*	2	3	

\*Less than 0.5 percent.

<sup>1</sup>Extent of use of housing in the growing and finishing of hogs is shown in appendix table 41 with the proportion from different types of buildings in appendix table 42. Data are for all types of housing combined, but separated according to floor types.

Producers in the North Central region provided separate shelter for about two-thirds of their breeding hogs (table 52). Typically, most small-volume producers let all hogs use the same facilities, while nearly all large-volume producers provided separate housing for breeding hogs. Additionally, half of all females were housed apart from all other hogs, including other breeding hogs, during their gestation period. Most large-volume producers provided this special housing, while those with small enterprises did not. Portable field shelters were the most common type of housing, followed by open-front buildings.

In the Southeast, less than half of all breeding hogs were provided with separate shelter buildings. Little more than a third of all females had special housing during gestation. Several types of shelter buildings were used with no one type providing a dominant portion of the housing. In terms of existing capacity of nonportable housing used for breeding hogs in 1980, open-front buildings accounted for 80 percent of the total housing for un-bred animals and 47 percent of the amount used for gestating females. Fully enclosed buildings without access to open lots accounted for most of the remainder in both cases.

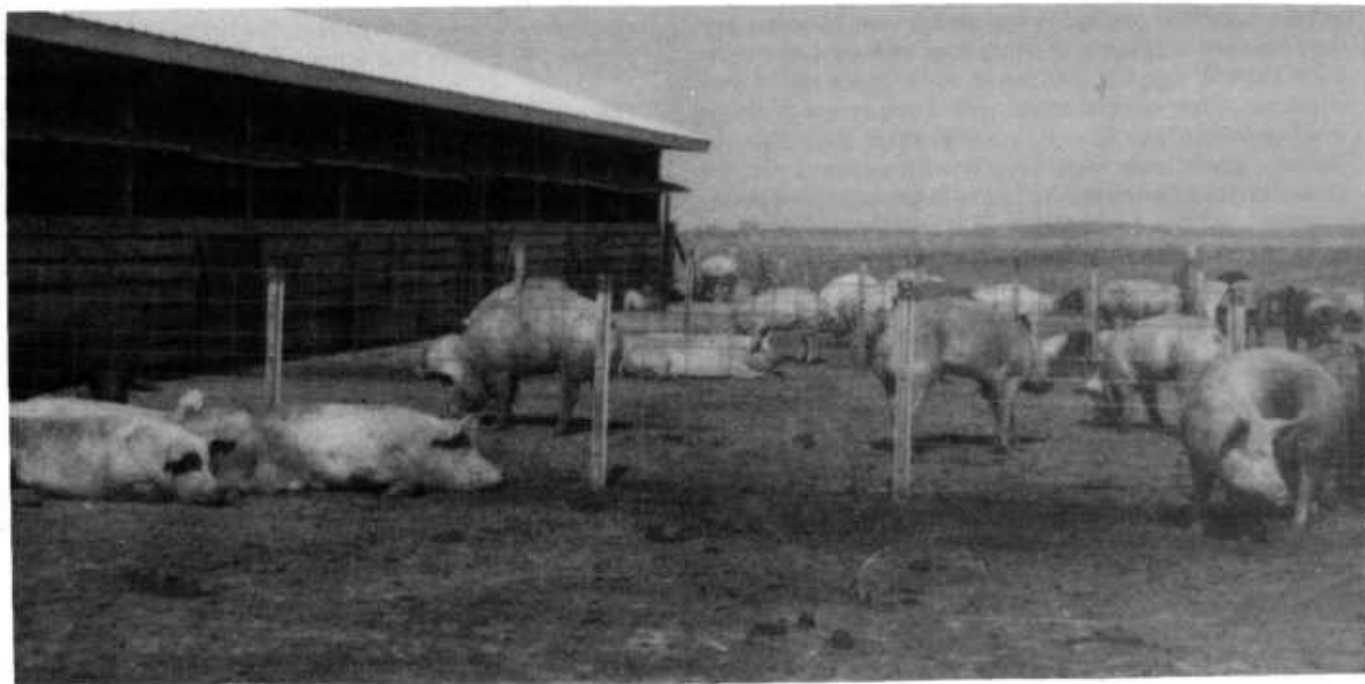
Waste handling is a relatively minor problem in care of breeding hogs. Few hogs are involved compared with those in other stages of production. Mostly, however, the extensive use of pastures, lots, and building-lot combinations results in only lim-

**Table 51—Period of construction for growing-finishing buildings in use in 1980<sup>1</sup>**

Type of housing for growing and finishing	Before 1950	1950-59	1960-69	1970-74	1975-79	1980
<i>Percent of capacity</i>						
Open-front buildings with:						
Paved floors	13	13	23	24	24	3
Slotted floors	6	*	9	25	56	4
Flush or scrape units	0	0	23	7	67	3
Fully enclosed buildings with:						
Paved floors	9	24	8	22	27	10
Slotted floors	2	*	27	12	44	15
Flush or scrape units	4	*	35	7	45	9

\*Less than 0.5 percent.

<sup>1</sup>The pattern of construction differed by both type of enterprise and region (app. table 45). Date of construction is defined as the year built or the year of last remodeling equivalent to one-third or more of the cost of new construction.



Open-front building with paved lots for hogs in growing-finishing stage. Open-front housing requires less investment than totally

enclosed housing, but winter weather and waste runoff can be problems.

ited accumulation of wastes inside of housing. As a result, little use has yet been made of the special systems for cleaning floors. Only an eighth of the total capacity of nonportable housing included self-cleaning types of floors, and those were on farms with the largest operations.

Much of the housing for breeding hogs was in buildings 20-30 years old or more. Construction was recent only for the small portion of total shelter capacity that was in buildings equipped with self-cleaning floors. Most farmers obviously shelter their breeding hogs in whatever kinds of buildings happen to be available on their farms. Only the largest volume producers are constructing special facilities for breeding hogs and gestating females.

### Miscellaneous Facilities

A number of miscellaneous facilities and services are important in hog production, especially in the larger operations. Most represent only small investments compared with the cost of such items as major buildings or feed-handling systems, but their importance is greatly magnified as production systems become larger and more centralized.

*Paved lots* seldom represent a large investment, but their use does indicate that the operator probably uses certain practices, that the animals are subjected to extremes in winter weather, and that the operation has the potential for contaminated runoff. Use of paved lots in hog production is gradually lessening as farmers move their operations into confinement. Nevertheless, more than half of all farms on which hogs were produced in the North Central region in 1980 used some paved lots in their programs, often in conjunction with confinement buildings which permitted hogs access to outside areas (app. table 46). Typically, paved areas were large enough on farms with the smaller hog enterprises to indicate that hog feeders were proba-

bly placed in the lot. Paved lot space was quite limited on farms with larger enterprises, probably being used only in association with care and shelter of breeding animals.

Paved lots were in use on about 30 percent of all farms in the Southeast in 1975. The proportion had dropped to about 5 percent in 1980. On farms that used paved lots, the space was sufficient only for special uses, probably for breeding hogs, as in the North Central region.

*Uninterrupted electrical service* is essential to most hog operations. Loss of power may interrupt feed processing and distribution systems and water supplies. Feedstuffs are often not even accessible, depending upon type of storage. The greatest risk from loss of electric power, however, is the loss of heat and ventilation. The latter poses an especially critical problem for hogs in fully enclosed buildings. Suffocation occurs rather quickly when powered ventilation systems stop, especially in hot weather. Adequate ventilation is necessary throughout the year, however, regardless of climate, when enclosed housing is filled to capacity with hogs.

The importance of uninterrupted electrical service is reflected in producer investments in auxiliary generators. In 1980, only a fifth of all hog producers had auxiliary generators, but most farmers in the North Central region with the larger hog enterprises had them (app. table 47). Farmers with the smaller enterprises usually use tractor-powered generators. Self-powered, self-starting generators are more common on large operations, especially when some or all hogs are totally confined and can survive only a short time without ventilation.

The type of electrical service may also be important to hog producers in terms of size, cost, and type of electric motors that can be used (9). Most producers had only the usual single-phase service in 1980; only 7 percent were supplied with three-

Table 52—Type of housing for breeding hogs, by type of hog enterprise and region, 1980<sup>1</sup>

Enterprise and region	No separate housing	Portable field shelters	Open front building with lot	Fully enclosed building without access to lot	Fully enclosed building with access to lot	Mixed <sup>2</sup>
<i>Percent of breeding hogs</i>						
Feeder pig production:						
North Central	41	27	16	4	12	*
Southeast	62	12	11	12	2	1
Both regions	46	24	15	5	10	*
Farrow-to-finish:						
North Central	32	41	14	3	9	1
Southeast	55	19	16	8	2	*
Both regions	36	37	14	4	8	1

\*Less than 0.5 percent.

<sup>1</sup>Type of housing pertains to that provided for all kinds of breeding hogs, excluding gestating sows, when they were housed separate from other hogs in the breeding herd. Floors in the houses may be of any type. Producers who reported having no separate housing for breeding animals either provided no shelter buildings or allowed breeding animals to share shelter buildings with other hogs.

<sup>2</sup>Breeding animals on farms with two or more types of shelter.

phase electrical service. Up to half or more of those with the largest enterprises, however, had three-phase service.

*Proper sanitation* to control parasites and diseases is a major concern for most producers. To get buildings as clean as possible between groups of pigs, use of high-pressure spraying equipment was common in 1980, particularly for cleaning central farrowing houses and nursery buildings. Steam cleaners were in use on a small portion of farms with the larger enterprises.

*Scales* large enough to weigh hogs either on a walk-on basis in groups or in trucks can be a useful management tool. Typically, about half of the producers with the largest enterprises had such scales, but they were used on only a small proportion of all other farms. Overall, only 10 percent of all farmers producing hogs in 1980 had scales large enough to weigh groups or loads of hogs.

## Waste Management

Wastes produced by hogs, mostly manure and contaminated water, pose one of the most difficult problems for hog producers. Satisfactory management of these wastes is the single most troublesome issue associated with many operations. Waste

management becomes increasingly more complex as hog operations become larger and more specialized.

Hog producers employed a wide range of methods for handling hog manure in 1980. Major differences reflected the size of operation and location of production, changing technologies, and types of equipment and housing available.

Despite the problems it poses, hog manure is a useful byproduct of hog production for farmers who design their waste management programs to use it as effectively as possible. For other farmers, manure is nothing but a waste product that impedes the operation. Disposing of it at the lowest cost is their primary goal.

Farmers in the two regions used hog manure in greatly different ways in 1980. North Central farmers typically applied 90 percent or more of their hog manure, including both solids and liquids, to crop and pasture lands on their own farms (table 53). Most was moved directly from hog houses or manure storage facilities to the fields, but a small amount was first accumulated in lagoons; then used to irrigate crops. Some was provided free to neighboring farmers, but virtually none of it was sold. Disposal of manure, such as dumping it on waste land or putting it into a lagoon with no expectation of realizing any value from it, accounted for little of the hog manure produced in the North Central region. Other

Table 53—Use of hog wastes, by form of wastes, type of hog enterprise and region, 1980<sup>1</sup>

Enterprise and region	Dumped	On own land	Free to other farm	Sold	Recycle in feed	Lagoon	Lagoon and irrigate
<i>Percent of wastes</i>							
<b>Solid wastes:</b>							
Feeder pig production—							
North Central	1	91	8	0	0	0	*
Southeast	12	63	0	0	0	24	0
Farrow-to-finish—							
North Central	*	98	1	0	0	*	1
Southeast	19	45	0	0	0	34	2
Feeder pig finishing:							
North Central	1	96	2	0	0	1	*
Southeast	10	48	0	0	0	38	4
All solid wastes	1	94	2	0	0	2	1
<b>Liquid wastes:</b>							
Feeder pig production—							
North Central	5	70	13	0	0	4	8
Southeast	1	29	1	3	0	63	3
Farrow-to-finish—							
North Central	0	87	3	*	*	3	7
Southeast	1	20	2	0	*	63	14
Feeder pig finishing—							
North Central	0	88	4	0	0	4	4
Southeast	2	19	3	*	0	70	6
All liquid wastes	1	75	5	*	*	12	7

\*Less than 0.5 percent.

<sup>1</sup>Includes the disposition of wastes only on farms on which wastes were handled in some way. Alternatives for use of wastes include: *dumped*—wastes were removed from the hog production facilities, but were piled, dumped, or shoved aside and left; *on own land*—wastes were put on the farm operator's crop or pasture land; *free to other farm*—wastes were put on someone else's crop or pasture land free of charge; *sold*—wastes were sold; *recycle in feed*—wastes were recycled into the feed supply for hogs; *lagoon*—wastes were flushed or drained into a lagoon and not used for any purpose; *lagoon and irrigate*—wastes were flushed or drained into a lagoon and later used to irrigate crop or pasture land. Methane gas was not produced for use as a fuel on any of the farms in the survey.

possible uses, such as recycling of aerobically treated (or oxidized) wastes into the feed supply (5), were reported only in isolated cases.

Waste management programs were quite different on farms in the Southeast. First, a high proportion of producers did not handle manure. Those who did handle manure applied only about half of the solid wastes and a fifth of the liquid wastes to their crop and pasture lands (table 53). Most of the remaining wastes were put into manure lagoons which accounted for up to 70 percent of all liquid manure handled by farmers with feeder pig finishing operations. Restricted crop production on farms in the Southeast, coupled with mild weather which allows the manure to decompose throughout most of the year, influence farmers to choose lagoons rather than to apply manure to cropland. Other possible beneficial uses of hog manure were of little importance in the Southeast.

The size of the hog enterprise affected producer choice as to the disposition of manure only to a limited extent. Special uses, such as for irrigation or recycling into the feed supply, were made only on farms with the larger enterprises. Otherwise, average uses applied essentially to operations of all sizes.

Some large specialized hog operations encounter substantial difficulty in disposing of hog wastes. Producers whose farms do not include enough cropland for use of manure commonly use

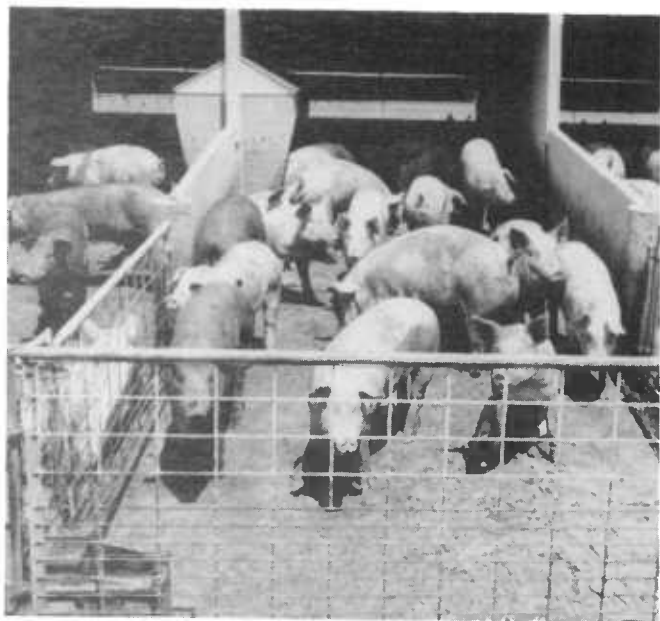
lagoons, which have to be cleaned periodically and may prove troublesome because of limited space or close neighbors who object to the odors, or provide the manure without charge to neighboring farmers for use on their cropland. Hog manure contains plant nutrients, but few hog producers have been able to sell it. In fact, large-volume producers have encountered varying degrees of difficulty even giving it away to other farmers. Known arrangements range from the hog producer's providing the loading and spreading equipment and manure, without charge, to neighboring farmers who do the hauling and spreading with their own tractors, to payments of sizable rental fees for cropland on which the hog producer puts the manure but has no interest in the crops produced.

The reluctance of other farmers to accept hog manure, even when free, stems from a number of reasons. The time and expense of hauling and spreading can become excessive relative to the value of the plant nutrients in the wastes unless fields are available close by. Relatively large tractors are needed for field application, especially for soil injection of the liquids which is preferred to surface spreading. Applications must be made largely during tillage work in spring or after harvest. Both time periods can be short, and other work is often more pressing. Also, farmers who might profitably use hog manure on their land are often unwilling to accept the possibility of complaints against them for environmental pollution. Some producers who have successfully managed the production aspects of large hog enterprises in the past without crop production eventually bought substantial acreages of farmland primarily to have control over a land area on which to place hog manure.

Farmers in the North Central region used production systems in 1980 such that each hog raised in farrow-to-finish operations produced manure containing major plant fertility elements—nitrogen, phosphorus, and potassium—worth up to \$5.60, after allowing for losses in handling and land application (4), based on 1980 prices for those elements in commercial fertilizers. The value of those elements ranged up to of \$1.75 per head on farms that produced feeder pigs and up to \$3.05 per head on farms that finished pigs.

These same North Central hog producers also grew substantial amounts of crops. For example, corn averaged 105 acres per farm on farms with the smallest farrow-to-finish enterprises, 685 acres on farms with the largest farrow-to-finish enterprises. Thus, the crops grown need large amounts of nutrients and large amounts of nutrients were available in the hog manure, which farmers reported putting on the land.

The economic benefit from hog manure should be great on hog-grain farms in the North Central region. Evidence is strong, however, that farmers realize exceedingly small benefits from using hog manure in crop production. An analysis of Illinois farm record data based on over 500 farm businesses for 1977-81, and covering the same range in size of hog enterprises as the 1981 survey, revealed that credits for hog manure generally



Breeding stock are now about the only hogs not kept in continual confinement, except in the very largest operations. These breeders are shown in their outside lots, with an open-front shed in back. Producers generally raise their female breeders but buy their breeding boars.



range from only 5-15 percent of the values of the fertility elements in it.<sup>11</sup> This limited value results primarily from two common management practices. First, even when liquid manure is carefully stored then injected into the soil, the main objective seems to be to rid the production site of manure in a nonpolluting manner; the manure's value as a fertilizer is a secondary consideration. Heavy and repetitive applications to nearby fields are common. Second, many producers have not coordinated the use of hog manure and commercial fertilizers in their overall crop fertility program and apply commercial fertilizers at the same rates (set for high crop yields) to all land, regardless of whether they have been manured. As a result, farmers incur the same costs for commercial fertilizers with or without manure, and get little or no yield response from manure.

It is likely that hog producers throughout the North Central region follow waste management and crop fertility programs similar to those used by Illinois farmers. Recognition of the nutrient needs of crops relative to the nutrients applied from all sources therefore holds the potential of a large reduction in expenditures for commercial fertilizers on grain-hog farms in the North Central region. Producers in the Southeast get little economic benefit from hog manure, but neither do they incur high costs of land application.

Uses of hog manure other than for fertilizing crops, such as recapturing its feed nutrient values or producing methane gas for fuel, warrant investigation as hog operations become larger. However, technologies will need further refinement, and input price relationships will have to change before producers will have choices much beyond either using hog manure to fertilize crops or least-cost disposal. In 1980, producers were trying other alternatives only on an experimental basis.

When U.S. hog producers first began to produce hogs in confinement, an operation that turned out a few hundred head per year was considered large. Producers used buildings with paved floors, scraped out the manure by hand, and spread it on cropland. Even though the amount of manure that had to be handled was small, this system was quickly found to be unacceptable because it involved difficult, disagreeable work which typically accounted for three-fourths of the total labor spent in hog production.

The early problems encountered in the management of wastes from hogs produced in confinement quickly led to intensive research and development (which still continue) in housing, equipment, and alternatives for use of manure. As noted in the previous section of this report, farmers who produce hogs in confinement now use buildings designed as much for the control of wastes as for any other needs of the enterprise. They can

choose from many kinds of equipment designed specifically for handling solid or liquid wastes. Research has discovered new uses for hog manure. As hog operations increase in size and yield larger quantities of manure, choices increase both as to systems for waste management and potential uses for the wastes. Required investments also increase as does the potential for and need to avoid pollution that may result from an improperly managed waste system (4).

## Bedding

Bedding materials account for a negligible part of total cost in hog production, but their use is of importance in the overall waste management program. When any bedding is used, producers must handle some solid wastes even though most of their hog wastes may be dealt with in liquid form.

Confinement housing usually does not require the use of bedding for hogs. In fact, bedding materials cannot be used in buildings designed for removal of manure through slotted floors or flush systems which are part of some of the newest farrowing houses, nurseries, and growing-finishing houses now in use. Despite widespread use of such advanced systems of confinement housing, however, most hog producers in the North Central region, especially those with breeding herds, used some bedding in their operations in 1980 (table 54). Typically, amounts of bedding used were small, ranging downward from a maximum of around 2 tons per 100 head of hogs sold in the smaller operations. Most producers with breeding herds in the Southeast also used some bedding in 1980, though generally to a lesser extent and in smaller amounts than in the North Central region.

Some bedding is used in older types of housing and in pasture systems of production. Largely, however, the general practice of keeping breeding animals in open housing, often associated with lot or pasture areas, accounts for a high proportion of producers using bedding. This practice will continue until the problems associated with total confinement of breeding animals are resolved.

Producers used bedding less frequently with feeder pig finishing than with pig-producing operations in both regions. Users of bedding were still in the majority, however, accounting for three-fourths of all farms in the North Central region, half in the Southeast. Commonly, small amounts of bedding are provided for pigs for the first few days after they arrive on the farm where they are to be finished.

Changes in crops grown and methods of harvesting have greatly reduced the availability of bedding materials for livestock. In spite of this, most hog producers who used bedding in the North Central region produced all their bedding needs. Those who bought bedding numbered less than a fifth of all users (app. table 48). Purchased bedding was mostly straw, costing about two-thirds as much per ton as average quality hay.

<sup>11</sup> From unpublished analysis of data from farm business records kept by farmers cooperating with the University of Illinois, Cooperative Extension Service, the Illinois Department of Agricultural Economics, and the Illinois Farm Business Farm Management Association.

A higher proportion of producers in the Southeast bought bedding than in the North Central region. Straw was the most common material purchased, as in the North Central region. Wood products (sawdust, bark, and wood shavings) were purchased by some Southeast producers at a much lower price than paid in the North Central region and far less than the cost of straw.

### Manure-Handling Equipment and Facilities

Alternatives for handling hog wastes are largely determined by the makeup of the farm business, the basic system of hog production, and design of hog housing. Choice is dictated partly by handling costs versus values of the wastes; partly by environmental concerns.

In the pasture system of production, which is still in limited use, most housing and equipment is portable. The waste problem is largely resolved by moving the production site periodically as wastes accumulate. With confinement housing and the permanent production sites that now dominate the industry, the only option is to move the wastes.

Farmers with small hog enterprises sometimes allow the small amounts that are produced to deteriorate on open lots or pasture or by diverting them into disposal areas. In 1980, this was a common practice on farms with smaller enterprises in the Southeast. More than half of all producers of slaughter hogs in the Southeast reported that they did not handle hog wastes (table 55). Even many of the larger volume producers in this region depended upon gravity flow to take wastes away from the

production site. In the North Central region, few producers with any type or size of hog enterprise operated without handling hog wastes in some way.

When waste management becomes a problem, as it was on virtually all farms in the North Central region and most of the larger hog enterprises in the Southeast, a basic decision is whether to handle it as a solid or a liquid. Farmers with smaller hog enterprises mostly handled manure as a solid in 1980 (app. table 49). Many had older facilities not designed for collection and storage of manure in liquid form. Remodeling of buildings and purchase of equipment to handle liquid manure would require large investments. As size of operations becomes larger, however, the cost advantages shift toward handling wastes in liquid form. Buildings can be made essentially self-cleaning, labor can be reduced, and there are more alternatives for moving and using liquids than solid wastes.

The larger volume producers had nearly all adopted systems to handle manure in liquid form in 1980, regardless of type of hog enterprise or geographic location. Many still had to deal with both liquids and solids due to some use of bedding, especially for breeding hogs, and paved floor housing in parts of their operation. Most of the manure produced in these operations, however, was handled as a liquid, even when both solid and liquid systems were in use.

Differences between the basic waste management systems in the two regions are quite apparent in the equipment and facilities used by producers. Most producers in the North Central region put manure on cropland, hence virtually all who produced

Table 54—Use of bedding for hogs, by type and size of hog enterprise and region 1980<sup>1</sup>

Region and size of enterprise (head)	Feeder pig production		Farrow-to-finish		Feeder pig finishing	
	Farms using bedding	Bedding per 100 head	Farms using bedding	Bedding per 100 head	Farms using bedding	Bedding per 100 head
	Pct	Tons	Pct	Tons	Pct	Tons
North Central:						
100 to 199	69	1.1	92	2.4	78	2.8
200 to 499	99	2.2	100	2.6	74	1.4
500 to 999	100	1.3	93	2.4	85	2.0
1,000 to 1,999	99	.5	97	1.7	59	1.5
2,000 to 4,999	100	1.3	94	.6	76	.9
5,000 & over	31	.1	51	.8	73	.5
All	89	1.3	96	2.0	76	1.6
Southeast:						
100 to 199	88	1.5	73	1.8	76	1.6
200 to 499	80	.6	66	1.7	29	.5
500 to 999	70	1.1	62	.7	15	.7
1,000 to 1,999	66	.4	67	.7	21	.4
2,000 to 4,999	40	.7	28	.4	13	.1
5,000 & over	31	1.2	37	.5	7	*
All	81	.9	68	1.2	50	.9

\*Less than 0.05 ton.

<sup>1</sup>Applies only to farms on which bedding was used.

slaughter hogs used some type of loading and spreading equipment, regardless of the size of the hog enterprise (table 56). Over three-fourths of all feeder pig producers were also fully equipped to clean buildings, load, haul, and spread manure. In the Southeast, the situation was nearly reversed with two-thirds to four-fifths of all producers not using manure loaders or spreaders of any kind in 1980, choosing instead some type of manure disposal system.

Tractor-mounted front-end loaders and spreaders for handling solid manures were used by most North Central farmers to handle solid manures in 1980 (table 56). In addition, a fifth or more used self-propelled skid loaders which are rather costly special-purpose machines. Farmers in the Southeast made

essentially no use of skid loaders, and few used any of the more traditional kinds of equipment for handling solid manure.

Typically, producers with the smaller hog enterprises did not have systems to collect liquid manure, hence did not use liquid manure-handling equipment. Overall, liquid manure-spreading equipment was used by no more than a third of all producers in the North Central region in 1980; and 5 percent or less of those in the Southeast (table 56). On farms with the larger hog enterprises, however, liquid spreaders were common in the North Central region, being used by about 80 percent of all producers with annual sales of 2,000 or more hogs. Most producers with the larger hog enterprises used spreaders that injected liquid manure below the surface of the soil rather than applying it to the land surface. Injection requires more power than surface application and it cannot be done when the ground is frozen, but it minimizes losses of the fertility elements in the manure and reduces the pollution from runoff. Mostly, however, producers have chosen soil injection to minimize odors during the spreading operation—a source of complaints from neighbors.

The time pattern of investments for manure-handling equipment indicates the impact of changing technologies and the increasing size of hog enterprises. Purchases of all types of solid manure-handling equipment in use in 1980 were spread over the previous 20 years, largely according to requirements for replacements (app. table 50). Two-thirds of all liquid manure-handling equipment were purchased during 1975-80, and only an eighth of all machines were more than 10 years old. Ninety percent of the equipment for flushing barn floors and for irrigating crops with liquid manure were purchased during 1975-80.

Few hog producers store manure in solid form other than for the short period of time it may accumulate on the floors of the buildings and lots. The practice of continuous bedding and the

**Table 55—Form in which hog waste is handled, by type of hog enterprise and region, 1980<sup>1</sup>**

Enterprise and region	Not handled	Solid form	Liquid form	Both solid and liquid forms
<i>Percent of farms</i>				
Feeder pig production:				
North Central	*	38	2	37
Southeast	17	68	9	6
Farrow-to-finish:				
North Central	1	83	3	13
Southeast	56	23	15	6
Feeder pig finishing:				
North Central	5	69	16	10
Southeast	55	25	12	8

\*Less than 0.5 percent.

<sup>1</sup>See appendix table 49 for data by size of enterprise.

**Table 56—Use of manure-handling equipment, by type of hog enterprise and region, 1980**

Kind of equipment	Feeder pig production		Farrow-to-finish		Feeder pig finishing	
	North Central	Southeast	North Central	Southeast	North Central	Southeast
<i>Percent of farms</i>						
Front-end loader, tractor	48	11	66	16	55	11
Skid loader, self-propelled	19	*	20	*	37	0
Spreader, solid	74	17	95	12	77	28
Spreader, liquid with soil injectors	5	2	6	3	18	1
Spreader, liquid for surface application	30	1	9	2	6	3
Spreader, liquid of any kind	35	3	15	5	23	3
Loaders and spreaders of any kind	77	21	98	24	94	32
Scraper, tractor	19	28	39	25	30	25
Liquid manure irrigation	*	*	*	*	*	*

\*Less than 0.5 percent.

**Table 57—Types of liquid manure storage and capacity, by type of hog enterprise and region, 1980**

Enterprise and region	Pit below building	Pit outside building	Slurry tank <sup>1</sup>	All types <sup>2</sup>	Liquid manure storage per head of sales <sup>3</sup>
----- Percent of farms-----					Gal
Feeder pig production:					
North Central	19	19	0	37	42
Southeast	9	9	*	13	65
Farrow-to-finish:					
North Central	12	5	1	16	96
Southeast	7	2	1	8	78
Feeder pig finishing:					
North Central	20	7	*	26	88
Southeast	3	*	*	3	67

\*Less than 0.5 percent.

<sup>1</sup>Commonly an above-ground steel or concrete storage tank.

<sup>2</sup>Percent of farms with any type of storage for liquid manure.

<sup>3</sup>Amount of storage per head of sales is based only on farms that had storage for liquid manure.

buildup of manure packs, common in cattle feedlot operations, is not followed in hog production. Solid manures are regularly removed from housing and spread on fields or disposal sites.

Liquid manure-handling systems require storage facilities, especially if the manure is to be kept for some use. Even when liquid manure is to be flushed to a lagoon, some type of storage is often used to collect part or all of the liquids before they are discharged into the lagoon. Storage pits built beneath hog houses with some type of slotted floor were most common on farms in 1980 (table 57). Storage pits constructed outside of buildings were used on some farms. Above-ground steel or concrete tanks for storing concentrated liquid manures or slurries were used in only a few of the largest operations.

The amount of storage required for liquid manure depends upon many factors including the type of hog enterprise (hence amount of manure produced per head), proportion of all manure handled as a liquid, amount of water used in cleaning, intended use of the manure, cropping system, and climate (4). A hog-grain producer in the North Central region must often plan in terms of storage for up to 6 months with surface application or soil injection done in spring and fall during tillage operations. The milder climate in the Southeast allows more leeway to producers.

On the average, producers in the North Central region who used liquid manure storage provided nearly 100 gallons of storage capacity for each hog sold in operations that produced slaughter

hogs; about half as much on farms that produced feeder pigs (table 57). Southeast producers provided about three-fourths as much, but only a small proportion of them provided any storage at all for liquid manure. Types of storage for liquid manure and proportion of farms with such storage differed by the size of the hog enterprise, but capacity of storage was affected less by size of enterprise than the many other factors that were part of the total waste management program (app. table 51).

## Pollution Control

Farming operations, regardless of type or size, are enjoined from causing pollution from surface runoff from production sites (5). Only the larger operations, however, may be subject to regulations requiring registration of the operation and construction of specific facilities or use of specific practices in managing hog manure to control surface runoff. Nevertheless, all producers are becoming increasingly aware of the need to avoid pollution in any form, especially offensive odors that often escape during field application of manure and from manure lagoons.

The confinement system of hog production is the best known way to avoid pollution from runoff from the site of production (21). A high proportion of all producers now use this system of production. Some areas containing hog manure, however, are still exposed to precipitation and potential runoff. A number of producers, especially those in the Southeast, have therefore installed some of the major structures to control pollution from surface runoff. Lagoons serve the dual purpose of a site for manure disposal or storage, largely the former, and a catchment



Manure can be used by spreading it on cropland or, as shown here, injecting it into the soil. Although requiring considerable power, this practice produces less odor and reduces loss of fertility constituents in manure, compared with surface applications.

for all runoff from the site of production. In 1981, lagoons were in use on nearly all farms with the largest hog enterprises and many of those with smaller enterprises, sometimes serving only to stop runoff, but most often used to store all manure (app. table 52). Southeastern producers used lagoons more than other types of control systems. None of the other major runoff control devices—diversion terraces, settling basins, vegetative filters—were in use to any extent except on farms with the largest hog enterprises. Widespread efforts to minimize both air and water pollution during land application of manure are shown by the extensive use of soil injection rather than surface application of liquid manure.

## Marketing Hogs and Pigs

Changes have been taking place in the ways hogs and pigs are bought and sold just as changes have been taking place in production. Marketing methods that better suit the needs of larger and more highly specialized hog producers have gained an increasingly larger share of the total, but a variety of outlets were still in use in 1980.

The data in this section pertain to the major types of hogs and pigs bought and sold—feeder pigs and slaughter hogs (barrows and gilts)—by producers specializing in one of the three types of hog enterprises. Markets for cull breeding stock were not considered, nor were the marginal sales of nontypical animals, such

as the small number of feeder pigs sometimes sent to market by producers with farrow-to-finish enterprises.

### Feeder Pig Marketing

Feeder pig producers sold about three-fourths of their pigs either at a regular auction market or directly to a feeder pig finisher in 1980 (table 58). Direct sales were most common in the North Central region where pig producers and finishers are both numerous and often located relatively close to each other. Auction markets were the dominant outlet in the Southeast.

Feeder pigs were sold through several other outlets in 1980, but none accounted for more than an eighth of total production. The tele-auction marketing system—whereby pigs are weighed and graded either at an assembly point or on the farm, then auctioned by description via remote contact with buyers—accounted for about a fourth of the sales by midsize producers in the Southeast. Such producers had enough production to justify sales by this method, but not enough to engage in direct selling to finishers. This marketing method handled a smaller portion of pigs sold by producers in the North Central region.

Feeder pig production cooperatives, established principally to supply pigs to members who finish them for the slaughter market, accounted for only 10 percent of total pig production in the North Central region, but over half of the total output from units with annual production of 5,000 head or more. Production of

**Table 58—Proportion of feeder pigs sold through selected markets, by size of feeder pig production enterprise and region, 1980<sup>1</sup>**

Size of enterprise and region (head)	Direct to pig finisher	Regular auction	Tele-auction	Order buyer or dealer at farm	Deliver to co-op members <sup>2</sup>	Deliver to contractor <sup>3</sup>	Fed on shares <sup>4</sup>	Terminal market
<i>Percent of pigs sold</i>								
North Central:								
100 to 199	34	23	0	0	43	0	0	0
200 to 499	58	33	2	7	0	0	0	0
500 to 999	14	53	19	5	0	0	0	9
1,000 to 1,999	72	14	7	7	0	0	0	0
2,000 to 4,999	50	25	1	5	14	5	0	0
5,000 & over	42	0	0	2	53	2	1	0
All	46	29	7	5	10	1	*	2
Southeast:								
100 to 199	10	86	1	0	3	0	0	0
299 to 499	0	81	19	0	0	0	0	0
500 to 999	18	57	23	0	2	0	0	0
1,000 to 1,999	29	35	29	0	0	6	1	0
2,000 to 4,999	45	21	11	10	8	5	0	0
5,000 & over	17	33	0	0	0	50	0	0
All	18	54	13	1	2	12	*	0

<sup>1</sup>Less than 0.5 percent.

<sup>2</sup>Includes only feeder pigs sold from feeder pig production enterprises.

<sup>3</sup>Pig producer is part of a cooperative and pigs are delivered to members for finishing.

<sup>4</sup>Pigs are produced under contract and delivered to the contractor.

\*Pigs placed with a hog finisher on a share basis.

pigs under contract accounted for a similar proportion of output from the largest producers in the Southeast.

Some pigs were still bought in 1980 by order buyers or dealers at the farm, but this outlet was little used, regardless of size of enterprise or location of production. Shared pig production and pig finishing has the potential for lessening price risks for both types of producers, but only a trace of total pig production was handled on a share basis in 1980. The small proportion of pigs that moved through terminal markets were likely culled pigs destined for slaughter.

Finishers got their pigs in 1980 through much the same outlets as pig producers sold them, but there were differences because of interregional shipments, omission from the data of pigs sold by producers who did not specialize in pig production, and by volume of finishers. Direct purchases and regular auction markets accounted for most feeder pigs purchased by finishers as well as sales from pig producers (table 59). These two sources were used extensively by finishers with all sizes of enterprises. The tele-auction system, most common for midsize pig producers, was used mostly by large-volume finishers. The reverse situation applied to cooperative arrangements, as smaller volume finishers received pigs mostly from large cooperative production units. Order buyers and dealers were more important as a way to buy pigs in the North Central region than as a market for them, but were of little importance in the Southeast in either the purchase or sale of pigs.

Pig producers seldom used more than one type of market for their pigs in 1980 (app. table 53). About three-fourths of the producers in the North Central region sold all pigs through one market, while a fourth used two markets during the year. Virtually none tried three or more markets. Producers limited their sales almost completely to one type of market in the Southeast except for a small proportion of the larger operations who sold through two markets.

Pig finishers were much less constrained to a single source for their feeder pigs. Most got all pigs from a single type of market, but about a third of all producers used two sources of supply. Some producers in the North Central region, especially those with the larger finishing operations, got pigs through three or more sources during the year.

### Slaughter Hog Marketing

Most slaughter hogs were sold by producers directly to packers in 1980 (table 60). Direct sales accounted for about two-thirds of all sales regardless of type of hog enterprise or geographic location. Producers with the smaller enterprises sold about half of their hogs this way while operators with the larger enterprises typically sold about 80 percent direct to packers.

Terminal markets have declined in importance as a market for slaughter hogs for many years, but they still ranked second in the North Central region in 1980, accounting for over an eighth of total sales and taking hogs in nearly equal proportions from

**Table 59—Source of purchased feeder pigs, by producers specializing in feeder pig finishing, by size of hog enterprise and region, 1980<sup>1</sup>**

Size of enterprise and region (head)	Direct from pig producer	Regular auction market	Tele-auction market	Order buyer or dealer	Feeder pig production cooperative	Produced under contract
<i>Percent of feeder pigs</i>						
North Central:						
100 to 199	35	51	0	11	3	0
200 to 499	41	35	2	7	15	0
500 to 999	37	27	3	11	22	0
1,000 to 1,999	30	27	6	7	27	3
2,000 to 4,999	27	30	2	39	2	*
5,000 & over	35	23	20	18	4	0
All	35	32	4	12	16	1
Southeast:						
100 to 199	38	62	0	0	0	0
200 to 499	25	71	0	1	3	0
500 to 999	30	62	7	0	1	0
1,000 to 1,999	12	75	8	4	1	0
2,000 to 4,999	36	27	21	3	5	8
5,000 & over	24	35	24	2	3	12
All	26	58	9	2	2	3

\*Less than 0.5 percent.

<sup>1</sup>Feeder pigs purchased by producers with feeder pig production and farrow-to-finish enterprises are not included in this distribution.

operations of all sizes. Sales through regular auction markets and to order buyers and dealers at the farm each accounted for about a tenth of total sales, coming largely from farmers with the smaller enterprises. Several other types of markets or outlets for slaughter hogs were in operation in 1980 in the North Central region, but none accounted for more than 3 percent of all sales.

In the Southeast, most slaughter hogs not sold direct to packers in 1980 moved through regular auction markets, especially from

farms with the smaller enterprises. Several other outlets were in use, but none of them accounted for more than a small percentage of all sales.

Most producers, especially those with the smaller enterprises, moved all their slaughter hogs through one type of market in 1980 (app. table 54). From 10-20 percent of those with the larger enterprises sold through two types of markets during the year, but use of more than two types of markets was rare.

**Table 60—Types of markets used for slaughter hogs, by type and size of hog enterprise and region, 1980<sup>1</sup>**

Type and size of enterprise and region (head)	Regular auction market	Tele-auction market	Order buyer or dealer at farm	Deliver to contractor <sup>2</sup>	Terminal market	Direct to packer <sup>3</sup>	Cooperative slaughter	Other
<i>Percent of hogs</i>								
<b>Farrow-to-finish:</b>								
North Central—								
100 to 199	15	0	11	1	13	58	2	0
200 to 499	9	0	10	2	11	68	0	0
500 to 999	13	*	5	1	11	66	4	*
1,000 to 1,999	6	0	11	1	15	62	5	0
2,000 to 4,999	1	0	2	0	11	84	2	*
5,000 & over	0	0	7	1	13	79	*	0
All	8	*	8	1	12	68	3	*
Southeast—								
100 to 199	35	0	10	1	10	44	0	*
200 to 499	36	6	1	1	3	53	*	0
500 to 999	26	7	3	1	5	57	1	0
1,000 to 1,999	12	1	1	3	1	82	*	0
2,000 to 4,999	14	4	2	0	5	75	0	0
5,000 & over	7	1	4	3	1	84	0	0
All	23	4	3	1	4	65	*	*
Both regions, all sizes	10	*	8	1	12	67	2	*
<b>Feeder pig finishing:</b>								
North Central—								
100 to 199	2	0	39	0	22	37	0	0
200 to 499	8	0	0	0	32	54	6	0
500 to 999	5	*	6	6	14	69	0	*
1,000 to 1,999	13	0	8	*	18	54	7	0
2,000 to 4,999	2	0	18	2	17	61	0	0
5,000 & over	4	0	6	5	8	77	*	0
All	7	*	10	2	20	58	3	*
Southeast—								
100 to 199	50	0	0	0	0	50	0	0
200 to 499	17	0	15	0	2	66	*	0
500 to 999	27	0	2	0	0	71	0	0
1,000 to 1,999	20	1	3	3	2	71	0	*
2,000 to 4,999	9	8	7	10	7	59	*	0
5,000 & over	5	0	22	0	0	73	0	0
All	20	1	9	2	2	66	*	*
Both regions, all sizes	9	*	10	2	18	59	2	0

<sup>1</sup>Less than 0.5 percent.

<sup>2</sup>Includes only the slaughter hogs (barrows and gilts) from farrow-to-finish and feeder pig finishing enterprises. Sales of cull breeding stock are not included.

<sup>3</sup>Includes hogs produced under contract and delivered to the contractor.

<sup>4</sup>Includes hogs sold directly to a packer or a packer's country buying station and sales to local locker plants.

Traditionally, slaughter hogs have been sold on the basis of live weight with the buyer judging value from visual inspection. In the 1960's, packers began to offer the option of paying for hogs on the basis of their carcass grade and weight determined by measurements made after slaughter. Producers have been slow in accepting this method of pricing and packers have not promoted it strongly. Maintaining the identity of animals through slaughter poses problems, while, in addition, some producers may wish to remain anonymous. In 1975, only 9 percent of U.S. slaughter hogs were priced this way. Packers in the West North Central region bought 16 percent of their hogs on the basis of grade and weight that year (15).

Methods for pricing slaughter hogs were not greatly different in 1980 from 1975. Nationally, grade and weight sales accounted for 11 percent of total sales (14). Producers in the North Central region sold about a sixth of their hogs according to carcass grade and weight, those in the Southeast about half that proportion (table 61). Producers with smaller enterprises in the North Central region sold nearly all their hogs on the basis of live weight, partly because many used a market that offered no option. Those with larger enterprises accepted grade and weight pricing for up to nearly half of their hogs, but in no case did grade and weight selling approach the proportion of hogs sold direct to packers. In fact, few producers sold all of their production on the grade and weight basis, choosing instead to test the market continually by pricing only a part of their hogs this way.

## International Trade

The United States exports about 60 percent of the wheat and rice that it produces, about one-half the cotton, more than 40 percent of the soybeans, and about a third of the feed grains and tobacco (11). In contrast, international trade by the United States in meat animals and meat is quite small, especially for live hogs and pork.

**Table 61—Slaughter hogs sold on grade and weight rather than live weight basis, by type and size of hog enterprise and region, 1980<sup>1</sup>**

Size of enterprise (head)	Farrow-to-finish		Feeder pig finishing	
	North Central	Southeast	North Central	Southeast
	<i>Percent of hogs</i>			
100 to 199	3	6	2	11
200 to 499	5	15	11	8
500 to 999	11	7	19	5
1,000 to 1,999	15	2	10	6
2,000 to 4,999	46	5	20	9
5,000 & over	39	8	14	5
All	16	8	13	6

<sup>1</sup>Data reflect the pricing method for sales of slaughter barrows and gilts from farrow-to-finish and feeder pig finishing enterprises.

The United States exports a few thousand live hogs each year (table 62). All are breeding animals, mostly gilts, and are shipped primarily to countries in Latin America and the Far East. Imports of live hogs, all of which come from Canada and are for slaughter, have been substantially above exports, especially in recent years, exceeding 247,000 head in the peak year of 1980. These imports, however, have never accounted for as much as 0.3 percent of the total number of hogs slaughtered in the United States, and have been well below that level most years since 1965.

Exports of pork have generally trended upward since 1965, reaching 453 million pounds carcass equivalent in 1981. About one-third goes to the territories of Puerto Rico and the Virgin Islands, the remainder to foreign countries. Imports of pork during 1965-81 were somewhat above exports amounting to 541 million pounds in 1981 (table 62). Imports and exports of pork largely offset each other in terms of quantity and each has amounted to only about 3 percent of domestic production in recent years. The value of pork exported in 1981 was \$253 million compared with a \$494 million value for imported pork.

The United States had a net export balance of about \$1 billion in tallow, grease, lard, variety meats, and casings in 1981 (13). These products come from all livestock, including hogs, but their values are not separated according to specie.

**Table 62—U.S. imports and exports of pork and live hogs, 1965-81**

Year	Pork <sup>1</sup>		Live hogs <sup>2</sup>	
	Exports and shipments to U.S. territories	Imports	Exports	Imports
	<i>Million pounds</i>		<i>1,000 head</i>	
1965	149	382	12.2	14.5
1966	158	430	9.6	22.7
1967	164	440	12.9	34.9
1968	208	462	13.7	21.7
1969	260	450	18.6	13.4
1970	194	491	24.8	67.8
1971	198	496	17.3	77.5
1972	236	538	12.3	89.0
1973	279	533	16.8	87.6
1974	204	488	15.8	196.3
1975	317	439	16.0	29.8
1976	421	469	10.8	45.6
1977	399	439	10.2	43.0
1978	421	495	12.7	202.4
1979	448	499	13.4	136.6
1980	417	550	16.3	247.3
1981	453	541	24.1	145.7

<sup>1</sup>Dressed weight equivalents including lard (11). U.S. production ranged from 11,779 to 16,616 million pounds dressed weight, including lard during 1965-81 (app. table 1).

<sup>2</sup>(13) Total slaughter of hogs in the United States ranged from 69.9 to 97.2 million head during 1965-81 (11).



- (1) Becker, D. E., A. H. Jensen, and B. G. Harmon. *Balanced Swine Rations*. Cir. 866. Coop. Ext. Serv., Col. of Agr., U. of Ill., Urbana. Mar. 1963.
- (2) Bursch, W. G., J. T. Scott, and R. N. Van Arsdall. *Characteristics and Prospects of the Market for Commercial Hog Feed in Illinois*. Bul. 743. Agr. Exp. Sta., Col. of Agr., U. of Ill., Urbana. Feb. 1973.
- (3) Hawton, Jerry, D. Bache, and B. McKenzie. *High-Moisture Grains for Swine*. Pork Industry Handbook, PIC-73. Coop. Ext. Serv., Col. of Agr., U. of Ill., Urbana. Sept. 1980.
- (4) Midwest Plan Service. *Livestock Waste Facilities Handbook*, MWPS-18. Iowa State Univ., Ames. July 1975.
- (5) \_\_\_\_\_. *Livestock Waste Management with Pollution Control*, MWPS-19. Iowa State Univ., Ames. June 1975.
- (6) \_\_\_\_\_. *Swine Handbook—Housing and Equipment*, MWPS-8. Iowa State Univ., Ames. 1972.
- (7) Parham, K. D., and D. B. Agnew. *Improvements in Grades of Hogs Marketed*, ERS-675. U.S. Dept. Agr., Econ. Res. Serv. Dec. 1982.
- (8) Schertz, L. P., and others. *Another Revolution in U.S. Farming?* AER-441. U.S. Dept. Agr., Econ., Stat., and Coop. Serv. Dec. 1979, pp. 190-254.
- (9) Soderholm, L. H. and H. B. Puckett. *Selecting and Using Electric Motors*, Farmer's Bul. No. 2257. U.S. Dept. Agr., Ag. Res. Serv. 1974.
- (10) U.S. Congress, Senate Committee on Agriculture, Nutrition, and Forestry. *Costs of Producing Livestock in the United States—Final 1979, Preliminary 1980, and Projections for 1981*. Prepared by the Econ. and Stat. Serv., U.S. Dept. Agr. Senate Committee Print 72-5500, Mar. 1981.
- (11) U.S. Department of Agriculture. *Agricultural Statistics*. 1940-80.
- (12) \_\_\_\_\_. Economic Research Service. *Economic Indicators of the Farm Sector: Costs of Production, 1982*. ECIFS 2-3. Dec. 1983.
- (13) \_\_\_\_\_. Economic Research Service. *Livestock and Meat Statistics*, Stat. Bul. No. 522. 1973-81.
- (14) \_\_\_\_\_. Packers and Stockyards Administration. *Packers and Stockyards Resume*. Vol. XIX, No. 5. Mar. 1982.
- (15) \_\_\_\_\_. Packers and Stockyards Administration. *Packers and Stockyards Resume*. Vol. XIV, No. 7. Dec. 1976.
- (16) \_\_\_\_\_. Statistical Reporting Service. *Agricultural Prices*. 1970-79.
- (17) \_\_\_\_\_. *Hogs and Pigs*. 1978-82.
- (18) U.S. Department of Commerce, Bureau of the Census. *1974 and 1978 Census of Agriculture*.
- (19) Van Arsdall, R. N. *Structural Characteristics of the U.S. Hog Production Industry*, AER-415. U.S. Dept. Agr., Econ., Stat., and Coop. Serv. Dec. 1978.
- (20) Van Arsdall, R. N., and others. *Costs and Returns of Producing Livestock in the United States—Final 1980, Preliminary 1981, and Projections for 1982*. Staff Report No. AGES-820201. U.S. Dept. Agr., Econ. Res. Serv. Feb. 1982.
- (21) Van Arsdall, R. N., and R. B. Smith. *Economic Impact of Controlling Surface Runoff from Point Source in U.S. Hog Production*, AER-263. U.S. Dept. Agr., Econ. Res. Serv. July 1974.
- (22) Wilken, D. F., R. P. Kesler, and C. E. Cagley. *Summary of Illinois Farm Business Records—1980*, Cir. 1193. Coop. Ext. Serv., Col. of Agr., U. of Ill., Urbana. Aug. 1981.

Appendix table 1—Total U.S. meat production and consumption, carcass weight, 1950-82<sup>1</sup>

Year	Production					Consumption					
	Beef	Veal	Lamb and mutton	Pork	Total	Beef	Veal	Lamb and mutton	Pork	Total meat	Lard
	-----Million pounds-----					-----Pounds/capita-----					
1950	9,534	1,230	597	13,157	24,518	63.4	8.0	4.0	84.9	160.3	14.0
1951	8,837	1,059	521	14,191	24,608	56.1	6.6	3.4	88.8	154.9	13.9
1952	9,650	1,169	648	14,259	25,726	62.2	7.2	4.2	89.6	163.2	13.6
1953	12,407	1,546	729	12,187	26,869	77.6	9.5	4.7	77.3	169.1	12.9
1954	12,963	1,647	734	12,002	27,346	80.1	10.0	4.6	73.8	167.7	11.2
1955	13,569	1,578	758	13,477	29,382	82.0	9.4	4.6	81.8	177.8	12.3
1956	14,462	1,632	741	13,804	30,639	85.4	9.5	4.5	82.7	182.0	12.8
1957	14,202	1,526	707	12,822	29,257	84.6	8.8	4.2	75.1	172.6	11.8
1958	13,330	1,186	688	12,673	27,877	80.5	6.7	4.2	73.0	164.3	11.5
1959	13,580	1,008	738	14,538	29,864	81.4	5.7	4.8	82.0	173.8	11.9
1960	14,753	1,109	768	13,905	30,535	85.1	6.1	4.8	77.7	173.6	10.8
1961	15,327	1,044	832	13,648	30,851	87.8	5.6	5.1	74.2	172.7	11.2
1962	15,324	1,015	808	13,953	31,102	88.9	5.5	5.2	75.0	174.4	10.8
1963	16,456	929	770	14,493	32,646	94.5	4.9	4.9	76.3	180.4	10.2
1964	18,456	1,013	715	14,598	34,782	99.9	5.2	4.2	76.2	185.6	9.1
1965	18,727	1,020	651	12,781	33,179	99.5	5.2	3.7	67.2	175.6	5.3
1966	19,726	910	650	12,798	34,084	104.1	4.6	4.0	65.7	178.3	5.5
1967	20,219	792	646	14,131	35,788	106.5	3.8	3.9	72.0	186.1	5.4
1968	20,880	734	602	14,515	36,731	109.7	3.6	3.7	73.5	190.5	5.6
1969	21,158	673	550	14,245	36,626	110.8	3.3	3.5	71.4	189.0	5.1
1970	21,685	588	551	14,699	37,523	113.5	2.9	3.2	72.6	192.3	4.6
1971	21,904	547	556	16,006	39,013	112.7	2.7	3.2	78.7	197.2	4.2
1972	22,413	458	543	14,422	37,836	115.5	2.2	3.3	70.9	191.9	3.7
1973	21,278	357	512	13,223	35,370	108.8	1.8	2.7	63.4	176.7	3.3
1974	23,137	486	464	14,331	38,418	115.7	2.3	2.3	68.5	188.8	3.2
1975	23,975	873	411	11,779	37,038	118.8	4.1	2.0	55.4	180.3	2.8
1976	25,969	852	371	12,688	39,880	127.5	4.0	1.8	58.6	191.9	2.6
1977	25,279	833	350	13,248	39,710	124.0	3.8	1.7	60.5	190.1	2.2
1978	24,241	631	310	13,393	38,575	117.9	2.9	1.6	60.3	182.7	2.2
1979	21,447	435	291	15,450	37,623	105.5	2.0	1.5	68.8	177.8	2.4
1980	21,643	400	318	16,616	38,977	103.4	1.8	1.5	73.5	180.2	2.4
1981 <sup>2</sup>	22,389	436	338	15,872	39,034	104.3	1.9	1.6	69.9	177.8	2.5
1982 <sup>2</sup>	22,536	448	365	14,229	37,578	104.4	2.0	1.7	62.7	170.8	2.5

<sup>1</sup>This historical series has been revised to reflect hog production on a packer-style dressed-weight basis the same as for beef, veal, lamb, and mutton. Lard is not excluded from the pork component. All edible offals are excluded.

<sup>2</sup>Preliminary.

Source: (11).

Appendix table 2—Distribution of U.S. hog production, 1950-80<sup>1</sup>

Region/State	1950	1955	1960	1965	1970	1975	1980
<i>Percent of live weight</i>							
Corn Belt-Lake States:							
Eastern—							
Ohio	5.4	5.0	4.7	4.5	4.0	3.7	3.0
Indiana	8.5	8.1	8.9	8.3	7.9	8.0	7.0
Illinois	11.1	12.5	13.9	14.4	12.2	13.6	11.3
Michigan	1.5	1.4	1.3	1.2	1.2	1.3	1.4
Wisconsin	3.7	4.1	3.7	3.3	3.3	2.6	2.7
Total	30.2	31.1	32.5	31.7	28.6	29.2	25.4
Western—							
Minnesota	7.1	7.7	7.1	6.3	6.0	6.4	8.5
Iowa	22.5	23.5	22.8	24.2	23.3	23.4	24.4
Missouri	7.3	6.6	7.0	7.3	7.9	6.8	6.7
Total	36.9	37.8	36.9	37.8	37.2	36.6	39.6
Northern Plains:							
North Dakota	.7	.9	.7	.6	.6	.6	.4
South Dakota	2.7	3.4	2.9	3.6	3.6	3.2	3.1
Nebraska	4.8	5.1	4.6	5.3	6.2	5.9	6.2
Kansas	2.2	1.7	2.0	2.6	3.3	3.1	3.3
Total	10.4	11.1	10.2	12.1	13.7	12.8	13.0
Southeast:							
Arkansas	1.1	.6	.7	.4	.5	.5	1.0
Louisiana	.7	.5	.3	.2	.2	.3	.2
Kentucky	2.0	1.8	2.3	2.3	2.2	2.0	1.9
Tennessee	2.0	1.8	2.0	1.9	1.6	1.7	1.8
Mississippi	.9	.8	.8	.6	.8	.6	.5
Georgia	1.9	2.0	2.2	1.9	2.5	2.4	2.8
Florida	.4	.5	.5	.4	.4	.3	.6
South Carolina	.7	.7	.7	.6	.8	1.0	.9
North Carolina	1.6	1.8	2.1	2.4	3.1	3.4	3.6
Virginia	1.2	1.0	1.0	1.0	.8	1.1	1.1
Alabama	1.5	1.5	1.5	1.2	1.5	1.5	1.4
Total	14.0	13.0	14.1	12.8	14.4	14.8	15.8
Southwest:							
Texas	2.1	1.6	1.5	1.3	1.8	1.6	1.4
Oklahoma	1.3	.9	.7	.6	.7	.6	.5
New Mexico	.1	.1	.1	.1	.1	.2	.1
Total	3.5	2.6	2.3	2.0	2.6	2.4	2.0
Other	5.0	4.4	4.0	3.6	3.5	4.2	4.2
48-State total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

<sup>1</sup>Percentages are based on live weight produced.

Source: (11).

**Appendix table 3—Annual sales of hogs and pigs, by size of hog enterprise and State, 1978<sup>1</sup>**

Region/State	Hogs and pigs sold	1 to 99	100 to 199	200 to 499	500 to 999	1,000 to 1,999	2,000 to 4,999	5,000 & over	Total
	Number	Percent of sales							
North Central:									
Ohio	3,362,628	10.8	12.1	25.4	22.4	15.8	11.3	2.2	100
Indiana	6,494,441	6.8	9.0	22.8	23.0	19.4	13.6	5.4	100
Illinois	9,274,942	5.4	8.2	22.9	23.8	22.4	12.3	5.0	100
Michigan	1,417,675	12.8	9.6	19.3	18.3	19.2	13.9	6.9	100
Wisconsin	2,590,367	13.3	14.2	27.0	22.2	12.1	6.0	5.2	100
Minnesota	6,697,327	7.2	10.6	27.6	25.5	16.4	9.6	3.1	100
Iowa	22,175,430	3.5	7.5	27.2	28.3	19.8	9.3	4.4	100
Missouri	6,566,334	11.6	14.8	29.3	21.2	12.6	6.8	3.7	100
Kansas	3,371,378	8.4	11.6	24.3	18.7	15.0	10.2	11.8	100
Nebraska	6,199,890	6.3	10.6	28.8	21.4	13.4	7.5	12.0	100
South Dakota	2,891,007	8.7	15.0	33.1	20.4	9.3	6.6	6.9	100
Total	71,041,419	6.7	10.0	26.5	24.2	17.4	9.7	5.5	100
Southeast:									
Alabama	1,119,337	23.1	14.9	21.3	14.2	10.8	9.6	6.1	100
Georgia	2,551,191	13.7	12.2	22.2	16.2	15.3	13.2	7.2	100
Kentucky	1,793,121	24.0	15.6	19.7	13.6	13.1	9.9	4.1	100
North Carolina	3,459,724	11.8	7.3	12.3	10.2	12.2	18.7	27.5	100
South Carolina	723,548	23.5	9.9	15.6	10.7	16.2	13.6	10.5	100
Tennessee	1,758,696	28.9	19.2	22.3	11.9	8.6	6.9	2.2	100
Virginia	955,361	18.2	11.4	15.7	16.6	11.9	11.2	15.0	100
Total	12,360,978	18.6	12.4	18.1	13.1	12.5	12.9	12.4	100
United States	92,140,548	9.6	10.4	24.5	21.8	16.3	10.2	7.2	100

<sup>1</sup>Includes the States and regions which were part of the 1981 survey of hog producers. Includes sales of all hogs and pigs from all farms. The enterprise size distribution is based on the sale of all hogs and pigs regardless of types.

Source: (18).

**Appendix table 4—Farms selling hogs and pigs, by size of hog enterprise and State, 1978<sup>1</sup>**

Region/State	Farms selling hogs & pigs	1 to 99	100 to 199	200 to 499	500 to 999	1,000 to 1,999	2,000 to 4,999	5,000 & over	Total
	Number	Percent of farms							
North Central:									
Ohio	18,398	59.8	15.9	15.2	6.1	2.2	0.7	0.1	100
Indiana	24,316	48.4	17.4	19.7	9.1	3.9	1.3	.2	100
Illinois	30,271	41.4	18.2	22.8	10.8	5.2	1.4	.2	100
Michigan	9,431	72.7	10.4	9.5	4.2	2.2	.8	.2	100
Wisconsin	16,056	61.5	16.7	14.3	5.4	1.6	.4	.1	100
Minnesota	27,315	46.0	18.7	21.9	9.3	3.2	.8	.1	100
Iowa	61,557	27.3	19.1	31.4	15.1	5.6	1.3	.2	100
Missouri	35,381	54.0	19.7	18.0	5.9	1.8	.5	.1	100
Kansas	14,294	50.2	20.0	19.1	6.7	2.8	.9	.3	100
Nebraska	22,460	39.7	21.3	26.2	8.9	2.9	.7	.3	100
South Dakota	12,996	42.3	24.0	24.6	6.8	1.6	.5	.2	100
Total	272,475	44.8	18.7	22.5	9.4	3.5	.9	.2	100
Southeast:									
Alabama	11,508	78.9	10.8	7.0	2.1	.8	.3	.1	100
Georgia	16,088	67.2	14.4	11.8	3.9	1.8	.7	.2	100
Kentucky	18,363	78.6	11.4	6.6	2.0	1.0	.3	.1	100
North Carolina	18,675	76.2	10.1	7.6	2.8	1.7	1.2	.4	100
South Carolina	8,709	86.6	6.3	4.3	1.3	1.0	.4	.1	100
Tennessee	20,021	78.4	12.4	6.8	1.6	.6	.2	.1	100
Virginia	8,819	80.8	9.1	5.7	2.8	1.0	.4	.2	100
Total	102,183	77.2	11.1	7.4	2.4	1.1	.6	.2	100
United States	470,518	59.8	14.8	15.7	6.4	2.4	.7	.2	100

<sup>1</sup>Less than 0.05 percent.

<sup>1</sup>Includes the States and regions that were part of the 1981 survey of hog producers. Includes sales of all hogs and pigs from all farms. The enterprise size distribution is based on the sale of all hogs and pigs regardless of types.

Source: (18).

**Appendix table 5—Annual sales of feeder pigs, by size of hog enterprise and State, 1978<sup>1</sup>**

Region/State	Feeder pigs sold	1 to 99	100 to 199	200 to 499	500 to 999	1,000 & over	Total
	<i>Number</i>	<i>Percent of sales</i>					
North Central:							
Ohio	660,886	12.9	12.5	24.0	20.1	30.5	100
Indiana	1,053,826	9.4	11.9	28.2	21.5	29.0	100
Illinois	1,280,660	7.6	10.6	24.1	21.7	36.0	100
Michigan	321,584	18.4	12.6	24.9	20.4	23.7	100
Wisconsin	893,383	13.7	14.8	29.0	21.3	21.2	100
Minnesota	1,828,754	7.0	11.0	29.0	24.6	28.4	100
Iowa	3,876,228	2.9	5.8	21.3	24.2	45.8	100
Missouri	1,906,523	14.5	17.3	28.7	19.2	20.3	100
Kansas	737,739	9.1	12.9	27.6	20.7	29.7	100
Nebraska	1,431,018	4.0	6.8	22.8	16.5	49.9	100
South Dakota	653,148	5.6	11.8	30.6	22.6	29.4	100
Total	14,643,749	7.8	10.5	25.5	21.7	34.5	100
Southeast:							
Alabama	316,388	26.7	19.6	21.7	12.7	19.3	100
Georgia	359,009	25.1	16.1	20.7	13.7	24.4	100
Kentucky	498,597	33.4	21.2	22.5	8.8	14.1	100
North Carolina	907,604	16.7	10.4	15.4	11.7	45.8	100
South Carolina	108,139	32.3	13.4	17.3	10.8	26.2	100
Tennessee	660,995	38.5	25.9	24.8	7.1	3.7	100
Virginia	224,465	25.7	15.1	20.3	10.9	28.0	100
Total	3,075,197	27.3	17.5	20.3	10.5	24.4	100
United States	20,020,360	12.7	120.0	24.0	19.1	32.2	100

<sup>1</sup>Includes the States and regions that were part of the 1981 survey of hog producers. Includes sales of all feeder pigs from all farms. The enterprise size distribution is based on the sale of all hogs and pigs regardless of types.

Source: (18).

**Appendix table 6—Farms selling feeder pigs, by size of hog enterprise and State, 1978<sup>1</sup>**

Region/State	Farms selling feeder pigs	1 to 99	100 to 199	200 to 499	500 to 999	1,000 & over	Total
	<i>Number</i>	<i>Percent of farms</i>					
North Central:							
Ohio	5,027	59.8	16.5	14.5	6.0	3.2	100
Indiana	6,538	47.4	20.0	20.3	8.0	4.3	100
Illinois	6,712	40.7	20.8	22.6	9.9	6.0	100
Michigan	2,913	66.2	13.7	12.4	5.0	2.7	100
Wisconsin	6,410	56.6	18.7	16.5	6.0	2.2	100
Minnesota	8,989	40.9	19.9	24.4	10.2	4.6	100
Iowa	13,209	23.7	17.9	31.9	17.0	9.5	100
Missouri	13,969	55.4	21.1	16.7	5.2	1.6	100
Kansas	4,365	44.4	22.2	21.8	7.7	3.9	100
Nebraska	4,950	31.4	21.4	30.1	10.9	6.2	100
South Dakota	3,124	31.0	25.5	30.2	10.1	3.2	100
Total	76,206	43.8	19.7	22.6	9.3	4.6	100
Southeast:							
Alabama	3,850	75.1	14.2	7.6	2.0	1.1	100
Georgia	4,485	72.0	14.2	9.5	2.6	1.7	100
Kentucky	7,664	78.8	12.7	6.5	1.2	.8	100
North Carolina	6,989	73.4	12.5	8.2	2.8	3.1	100
South Carolina	2,040	85.8	7.5	4.1	1.2	1.4	100
Tennessee	10,004	76.6	15.1	7.0	1.0	.3	100
Virginia	2,639	77.5	11.2	7.4	2.3	1.6	100
Total	37,671	76.3	13.3	7.3	1.8	1.3	100
United States	143,836	59.7	16.1	15.2	5.9	3.1	100

<sup>1</sup>Includes the States and regions that were part of the 1981 survey of hog producers. Includes sales of all feeder pigs from all farms. The enterprise size distribution is based on the sale of all hogs and pigs regardless of types.

Source: (18).

Appendix table 7—Distribution of hog and pig inventory by size of inventory per farm<sup>1</sup>

Size and year	14 States	9 States	U.S. total	14 States	9 States	U.S. total
	-----Percent of hog and pig inventory-----			-----Percent of operations-----		
1-99 head:						
1977	15.1	43.0	18.9	67.6	96.0	77.9
1978	14.1	42.0	18.0	68.8	95.0	78.4
1979	13.1	39.0	16.5	67.1	92.0	76.8
1980	12.6	35.0	15.8	67.5	92.0	77.3
1981	11.2	33.8	14.5	65.8	93.2	76.9
100-499 head:						
1977	48.7	32.0	45.8	27.7	3.0	18.7
1978	47.5	33.5	44.7	26.0	4.0	17.9
1979	44.7	36.5	43.1	26.9	7.0	19.0
1980	43.3	39.0	41.9	26.4	7.0	18.5
1981	41.4	33.5	40.0	27.2	7.0	18.4
500 head & over:						
1977	36.2	25.0	35.3	4.7	1.0	3.4
1978	38.4	24.5	37.3	5.2	1.0	3.7
1979	42.2	24.5	40.4	6.0	1.0	4.2
1980	44.1	26.0	42.3	6.1	1.0	4.2
1981	47.4	32.7	45.5	7.0	1.1	4.7

<sup>1</sup>The 14 States (Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Minnesota, Missouri, Nebraska, North Carolina, Ohio, South Dakota, Texas, Wisconsin) are the major hog-producing States for which SRS has been reporting data quarterly. The 9 States (Alabama, Michigan, Mississippi, North Dakota, Oklahoma, Pennsylvania, South Carolina, Tennessee, Virginia) are those of lesser importance in hog production for which SRS has been reporting data semiannually. Inventories are December 1 of the specified year. An operation as defined by SRS is any place having one or more hogs and pigs on hand at any time during the year. It does not have to be a farm.

Source: (17).

Appendix table 8—Annual sales of hogs and pigs relative to inventory, by size of hog enterprise and region, 1978<sup>1</sup>

Region	1 to 99	100 to 199	200 to 499	500 to 999	1,000 to 1,999	2,000 to 4,999	5,000 & over	All sizes
	Sales per head of inventory							
North Central	0.95	1.09	1.31	1.72	2.20	2.45	3.76	1.56
Southeast	1.11	1.48	1.48	1.62	1.73	2.37	2.81	1.60
Both regions	1.00	1.14	1.32	1.71	2.13	2.44	3.44	1.57

<sup>1</sup>Sales and inventories are for all farms selling hogs and pigs.

Source: (18).

**Appendix table 9—Size of hog production enterprises in 1980 compared with same enterprises in 1975, by type and size of hog enterprise and region<sup>1</sup>**

Type and size of enterprise and region (head)	1980 sales relative to 1975	1980 sales of hogs and pigs compared with 1975				
		Same (76-125 percent)	Larger (126-200 percent)	Much larger (over 200 percent)	Smaller (50-75 percent)	Much smaller (less than 50 percent)
Percent		Percent of farms				
<b>Feeder pig production:</b>						
North Central—						
100 to 199	104	100	0	0	0	0
200 to 499	91	68	9	4	0	19
500 to 999	130	51	7	31	8	3
1,000 to 1,999	156	17	20	51	1	11
2,000 to 4,999	137	64	6	30	0	0
5,000 & over	231	28	10	62	0	0
All	124	65	8	15	2	10
Southeast—						
100 to 199	59	40	7	31	13	9
200 to 499	176	30	17	53	0	0
500 to 999	74	11	17	3	69	0
1,000 to 1,999	226	2	40	52	6	0
2,000 to 4,999	155	53	6	39	0	2
5,000 & over	244	0	50	50	0	0
All	116	33	13	37	12	5
Both regions, all sizes	123	58	9	20	4	9
<b>Farrow-to-finish:</b>						
North Central—						
100 to 199	73	34	6	14	20	26
200 to 499	97	43	20	15	16	6
500 to 999	127	43	25	26	5	1
1,000 to 1,999	147	25	33	38	*	*
2,000 to 4,999	261	22	17	61	*	*
5,000 & over	170	19	39	42	0	0
All	121	39	17	19	14	11
Southeast—						
100 to 199	80	60	8	8	11	13
200 to 499	111	45	19	17	16	3
500 to 999	119	39	25	27	6	3
1,000 to 1,999	147	25	32	38	4	1
2,000 to 4,999	158	21	39	34	6	0
5,000 & over	158	33	36	31	0	0
All	120	49	16	15	12	8
Both regions, all sizes	121	40	17	19	13	11
<b>Feeder pig finishing:</b>						
North Central—						
100 to 199	144	59	11	30	0	0
200 to 499	111	48	33	11	1	7
500 to 999	113	49	22	24	0	5
1,000 to 1,999	145	26	41	28	5	*
2,000 to 4,999	196	13	35	51	1	0
5,000 & over	212	11	23	66	0	0
All	132	48	25	22	1	4
Southeast—						
100 to 199	86	78	0	0	22	0
200 to 499	110	34	24	35	2	5
500 to 999	78	18	5	51	7	19
1,000 to 1,999	156	25	32	35	5	3
2,000 to 4,999	156	19	12	58	10	1
5,000 & over	112	30	13	49	6	2
All	112	48	13	24	11	4
Both regions, all sizes	129	48	23	23	2	4
All farms, all regions	123	44	17	20	10	9

\*Less than 0.5 percent.

<sup>1</sup>The number of hogs and pigs sold in 1980 is divided by the number sold in 1975. This analysis includes only farms with sales of hogs or pigs both years.

Appendix table 10—Hogs and pigs produced in 1980 by farmers who were either not farming or sold no hogs or pigs in 1975, by type and size of hog enterprise and region

Type and size of enterprise (head)	North Central		Southeast	
	From farmers not farming in 1975	From farmers selling no hogs or pigs in 1975 <sup>1</sup>	From farmers not farming in 1975	From farmers selling no hogs or pigs in 1975 <sup>1</sup>
<i>Percent of hogs and pigs in 1980</i>				
Feeder pig production:				
100 to 199	0	61	1	16
200 to 499	0	49	6	13
500 to 999	12	32	35	38
1,000 to 1,999	19	19	19	32
2,000 to 4,999	12	20	28	41
5,000 & over	52	54	52	52
All	11	38	24	32
Farrow-to-finish:				
100 to 199	5	15	7	28
200 to 499	0	5	7	13
500 to 999	1	2	5	17
1,000 to 1,999	3	4	17	15
2,000 to 4,999	10	11	14	26
5,000 & over	24	27	14	17
All	4	7	10	20
Feeder pig finishing:				
100 to 199	25	37	0	52
200 to 499	21	32	11	16
500 to 999	3	9	11	44
1,000 to 1,999	7	10	18	19
2,000 to 4,999	5	15	12	30
5,000 & over	7	7	4	6
All	11	19	9	26

<sup>1</sup>Includes farmers who were not farming in 1975 and those who were farming in 1975, but sold no hogs or pigs.



**Appendix table 11—Type of hog production in 1975 of farmers who produced hogs in 1980, by type and size of hog enterprise and region, 1980**

Type and size of enterprise and region, 1980 (head)	Type of hog production in 1975 <sup>1</sup>			
	Producing no hogs or pigs	Feeder pig production	Farrow-to-finish	Feeder pig finishing
<i>Percent of farms</i>				
<b>Feeder pig production:</b>				
North Central—				
100 to 199	68	32	0	0
200 to 499	36	63	1	0
500 to 999	34	48	14	4
1,000 to 1,999	19	45	36	0
2,000 to 4,999	21	57	22	0
5,000 & over	57	40	1	2
All	45	49	5	1
Southeast—				
100 to 199	13	87	0	0
200 to 499	14	75	9	2
500 to 999	42	48	10	0
1,000 to 1,999	33	47	20	0
2,000 to 4,999	46	46	6	2
5,000 & over	38	62	0	0
All	18	76	5	1
Both regions	40	54	5	1
<b>Farrow-to-finish:</b>				
North Central—				
100 to 199	15	6	79	0
200 to 499	6	8	84	2
500 to 999	2	4	94	*
1,000 to 1,999	3	3	89	5
2,000 to 4,999	11	*	89	*
5,000 & over	23	0	77	0
All	8	6	85	1
Southeast—				
100 to 199	26	0	74	0
200 to 499	16	4	72	8
500 to 999	18	4	74	4
1,000 to 1,999	23	13	62	2
2,000 to 4,999	27	6	59	8
5,000 & over	19	3	75	3
All	22	2	72	4
Both regions	10	6	83	1
<b>Feeder pig finishing:</b>				
North Central—				
100 to 199	36	13	12	39
200 to 499	37	0	24	3
500 to 999	9	2	29	60
1,000 to 1,999	11	0	35	54
2,000 to 4,999	18	2	2	78
5,000 & over	5	5	27	63
All	29	5	21	45
Southeast—				
100 to 199	50	0	26	24
200 to 499	19	0	2	79
500 to 999	42	17	26	15
1,000 to 1,999	22	8	23	47
2,000 to 4,999	26	2	5	67
5,000 & over	12	0	6	82
All	37	2	17	44
Both regions	30	5	21	44

<sup>1</sup>Less than 0.5 percent.

<sup>2</sup>When the enterprise types match, then farms were conducting the same type of hog production in 1975 and 1980. Otherwise, farmers either operated a different type of hog enterprise in 1975 or produced no hogs or pigs.

Appendix table 12—Changes in farming and hog production between 1975 and 1980, by type and size of hog enterprise, and region

Type and size of enterprise (head)	North Central		Southeast	
	1980 hog producers who were:		1980 hog producers who were:	
	Farming in 1975 <sup>1</sup>	Producing hogs in 1975 <sup>2</sup>	Farming in 1975 <sup>1</sup>	Producing hogs in 1975 <sup>2</sup>
<i>Percent of farms</i>				
Feeder pig production:				
100 to 199	100	32	99	87
200 to 499	100	64	93	86
500 to 999	86	66	62	58
1,000 to 1,999	81	81	82	67
2,000 to 4,999	87	79	67	54
5,000 & over	45	43	62	62
All	96	55	91	82
Farrow-to-finish:				
100 to 199	95	85	93	74
200 to 499	100	94	90	84
500 to 999	99	98	95	82
1,000 to 1,999	97	97	84	77
2,000 to 4,999	90	89	85	73
5,000 & over	79	77	84	81
All	98	92	92	78
Feeder pig finishing:				
100 to 199	77	64	100	50
200 to 499	72	63	88	81
500 to 999	97	91	90	58
1,000 to 1,999	92	89	80	78
2,000 to 4,999	96	82	89	74
5,000 & over	95	95	94	88
All	80	71	94	63

<sup>1</sup>The number of farmers included in the 1981 survey who were engaged in farming of any type in 1975 is expressed as a percentage of the farmers producing hogs in 1980.

<sup>2</sup>The number of farmers included in the 1981 survey who were producing hogs in 1975 is expressed as a percentage of the farmers producing hogs in 1980. Levels below 100 percent reflect both those who were not farming in 1975 and those who were farming in 1975 but not producing hogs.

Appendix table 13—Land in hog farms, by tenure, size and type of hog enterprise, and region, 1980

Type and size of enterprise and region (head)	All farms		Owner operated		Part owned		Rented	
	All land	Cropland	All land	Cropland	All land	Cropland	All land	Cropland
<i>Acres per farm</i>								
<b>Feeder pig production:</b>								
North Central—								
100 to 199	273	41	0	0	356	59	130	10
200 to 499	279	243	104	61	396	364	0	0
500 to 999	245	147	168	53	362	269	160	146
1,000 to 1,999	329	235	185	65	317	250	467	339
2,000 to 4,999	457	352	268	189	505	383	800	760
5,000 & over	45	32	15	2	614	586	0	0
All	278	160	131	61	375	233	180	68
Southeast—								
100 to 199	95	59	83	63	112	53	0	0
200 to 499	301	120	432	84	205	146	0	0
500 to 999	428	217	147	59	554	288	0	0
1,000 to 1,999	403	137	867	172	262	153	8	0
2,000 to 4,999	319	206	156	59	559	423	0	0
5,000 & over	352	281	0	0	540	450	0	0
All	218	104	208	71	232	139	8	0
Both regions, all sizes	268	151	152	63	353	219	179	67
<b>Farrow-to-finish:</b>								
North Central—								
100 to 199	346	219	206	129	412	266	442	267
200 to 499	387	296	270	192	406	314	436	335
500 to 999	397	374	313	243	532	412	585	398
1,000 to 1,999	615	458	328	283	712	510	418	378
2,000 to 4,999	1077	765	441	376	1162	816	672	552
5,000 & over	1157	907	990	700	1521	1227	631	599
All	425	307	254	178	480	351	467	327
Southeast—								
100 to 199	327	203	248	81	356	242	279	279
200 to 499	434	249	372	138	465	279	330	317
500 to 999	541	344	462	163	579	393	425	334
1,000 to 1,999	768	426	805	218	763	500	505	301
2,000 to 4,999	983	628	302	117	1340	903	797	418
5,000 & over	1963	1019	1822	731	2058	1226	2500	2000
All	429	257	350	120	459	298	364	321
Both regions, all sizes	425	301	266	171	477	344	463	327
<b>Feeder pig finishing:</b>								
North Central—								
100 to 199	215	170	299	224	173	162	124	96
200 to 499	705	620	332	270	876	782	0	0
500 to 999	683	568	425	369	836	687	302	270
1,000 to 1,999	938	650	559	470	1144	572	346	324
2,000 to 4,999	652	551	334	275	813	682	298	274
5,000 & over	952	835	481	465	1158	997	0	0
All	554	463	341	273	785	663	162	143
Southeast—								
100 to 199	322	181	124	49	426	251	0	0
200 to 499	350	248	231	121	392	322	350	126
500 to 999	488	276	349	109	637	414	1	0
1,000 to 1,999	698	380	833	284	641	446	2	0
2,000 to 4,999	665	413	212	64	1065	717	46	1
5,000 & over	706	468	149	29	2899	2187	5	0
All	376	229	217	86	463	312	293	105
Both regions, all sizes	529	430	325	249	733	606	171	132

Appendix table 14—Land in hog farms in 1980 compared with 1975, by type and size of hog enterprise and region<sup>1</sup>

Type and size of enterprise and region (head)	Change in land farmed <sup>2</sup>	Land farmed in 1980 compared with 1975				
		Same land (76-125 percent)	More land (126-200 percent)	Much more land (over 200 percent)	Less land (50-75 percent)	Much less land (less than 50 percent)
	Percent of land	Percent of farms-----				
<b>Feeder pig production:</b>						
North Central—						
100 to 199	163	32	31	37	0	0
200 to 499	111	91	9	0	0	0
500 to 999	307	54	3	21	20	2
1,000 to 1,999	144	52	29	8	0	11
2,000 to 4,999	115	76	0	9	15	0
5,000 & over	144	79	4	7	10	0
All	161	62	17	17	3	1
Southeast—						
100 to 199	107	40	40	0	8	12
200 to 499	124	71	4	17	8	0
500 to 999	93	87	0	3	0	10
1,000 to 1,999	290	45	14	32	3	6
2,000 to 4,999	345	61	15	23	0	1
5,000 & over	183	0	50	0	0	50
All	123	55	24	7	7	7
Both regions, all sizes	155	61	18	15	4	7
<b>Farrow-to-finish:</b>						
North Central—						
100 to 199	107	68	14	3	15	0
200 to 499	128	68	21	4	4	3
500 to 999	138	73	18	7	2	*
1,000 to 1,999	158	57	24	13	4	2
2,000 to 4,999	205	34	10	46	6	4
5,000 & over	146	45	32	11	6	6
All	126	68	18	5	7	2
Southeast—						
100 to 199	107	63	13	4	20	0
200 to 499	121	70	12	7	10	1
500 to 999	200	47	28	15	1	0
1,000 to 1,999	156	55	23	20	1	1
2,000 to 4,999	298	50	28	14	1	7
5,000 & over	356	69	6	8	0	17
All	129	63	15	7	14	1
Both regions, all sizes	127	67	18	5	8	2
<b>Feeder pig finishing:</b>						
North Central—						
100 to 199	118	78	3	10	0	9
200 to 499	118	72	19	2	4	3
500 to 999	181	64	24	7	3	2
1,000 to 1,999	120	63	31	3	3	0
2,000 to 4,999	141	52	34	12	0	2
5,000 & over	201	42	12	33	2	11
All	133	71	16	6	2	5
Southeast—						
100 to 199	90	45	11	0	0	44
200 to 499	227	21	30	41	7	1
500 to 999	196	51	34	13	1	1
1,000 to 1,999	171	45	17	24	5	9
2,000 to 4,999	114	74	12	6	0	8
5,000 & over	143	40	8	24	12	16
All	150	39	19	15	3	24
Both regions, all sizes	135	66	16	8	2	8
All farms, all regions	134	65	18	8	6	3

\*Less than 0.5 percent.

<sup>1</sup>Includes only farms active in 1975 as well as 1980.

<sup>2</sup>Acres of land farmed in 1980 compared with acres farmed in 1975.

Appendix table 15—Crops raised on hog farms, by type of hog enterprise and region, 1980

Crop	North Central			Southeast		
	Feeder pig production	Farrow-to-finish	Feeder pig finishing	Feeder pig production	Farrow-to-finish	Feeder pig finishing
<i>Percent of farms</i>						
Corn, grain	77	96	96	88	92	82
Corn, silage	5	15	10	*	2	*
Soybeans	67	62	74	28	71	58
Wheat	16	30	36	12	26	23
Grain sorghum	4	10	6	17	7	1
Oats	38	46	32	*	2	*
Barley	1	1	5	1	4	15
Rye	3	1	4	2	1	1
Alfalfa	50	52	50	19	1	6
Other legumes	26	18	13	22	23	56
Tobacco	0	*	*	30	25	19
Cotton	0	0	0	*	3	1
Peanuts	0	0	0	24	10	
Other crops	1	2	4	1	5	2

\*Less than 0.5 percent.

Appendix table 16—Other livestock raised on hog farms, by type and size of hog enterprise and region, 1980<sup>1</sup>

Type and size of enterprise and region (head)	None	Beef cows	Cattle feeding	Beef cows and cattle feeding	Beef cows & stocker cattle	Other combinations of beef enterprises	Dairy	Sheep	Poultry	All other
<i>Percent of farms</i>										
<b>Feeder pig production:</b>										
North Central—										
100 to 199	0	68	0	0	32	0	0	0	0	0
200 to 499	69	0	0	0	0	6	2	0	13	0
500 to 999	45	14	0	12	3	0	13	0	13	0
1,000 to 1,999	69	0	20	0	0	0	8	0	0	0
2,000 to 4,999	39	44	5	3	0	0	0	9	0	0
5,000 & over	93	0	4	0	0	0	0	3	0	0
All	41	27	1	2	12	2	3	*	8	4
Southeast—										
100 to 199	36	29	30	0	0	0	0	0	0	5
200 to 499	46	18	0	2	13	18	0	3	0	0
500 to 999	64	10	0	0	26	0	0	0	0	0
1,000 to 1,999	80	13	0	0	3	0	0	0	3	1
2,000 to 4,999	50	28	2	14	0	3	0	0	0	3
5,000 & over	50	0	0	0	0	0	0	0	50	0
All	44	23	16	1	6	6	0	1	*	3
Both regions, all sizes	41	23	16	1	6	6	0	1	*	3
<b>Farrow-to-finish:</b>										
North Central—										
100 to 199	21	19	6	17	1	8	9	2	0	17
200 to 499	16	25	6	16	0	2	11	3	0	21
500 to 999	26	30	15	5	1	10	1	4	2	6
1,000 to 1,999	40	10	10	15	7	9	2	3	0	4
2,000 to 4,999	68	8	9	11	*	0	0	0	1	3
5,000 & over	76	4	11	5	0	0	0	3	1	0
All	22	22	8	14	1	6	8	3	*	16
Southeast—										
100 to 199	50	27	0	6	0	9	0	0	5	3
200 to 499	32	39	0	11	4	5	0	0	4	5
500 to 999	35	51	*	3	3	3	0	0	4	1
1,000 to 1,999	59	23	1	8	2	2	1	0	0	4
2,000 to 4,999	42	38	0	5	8	4	3	0	0	0
5,000 & over	52	36	1	0	0	2	0	0	2	7
All	42	34	*	8	2	6	*	0	4	4
Both regions, all sizes	24	24	7	13	1	7	7	2	1	14
<b>Feeder pig finishing:</b>										
North Central—										
100 to 199	17	34	15	25	0	0	9	0	0	0
200 to 499	24	6	11	8	9	15	11	0	0	25
500 to 999	31	0	14	18	3	11	2	3	0	18
1,000 to 1,999	39	12	17	15	*	8	6	0	2	1
2,000 to 4,999	31	3	30	4	3	2	0	2	5	20
5,000 & over	78	0	11	5	0	6	0	0	0	0
All	24	14	14	16	1	8	8	1	*	14
Southeast—										
100 to 199	0	71	0	0	0	0	20	0	0	9
200 to 499	50	35	4	0	1	4	0	0	1	5
500 to 999	38	39	0	12	0	10	1	0	0	0
1,000 to 1,999	48	32	2	0	0	8	0	0	0	10
2,000 to 4,999	48	14	0	4	3	9	2	0	9	11
5,000 & over	68	15	0	9	0	3	0	0	0	5
All	23	54	1	1	*	3	11	0	1	6
Both regions, all sizes	24	21	12	14	*	8	8	*	*	13
All farms, all regions	28	24	7	11	3	5	6	2	2	12

<sup>1</sup>Less than 0.5 percent.

Enterprises are listed as the only livestock enterprises in addition to hogs or as specific combinations of enterprises in addition to hogs. The all other category includes farms with all combinations of livestock and poultry enterprises not previously specified.

**Appendix table 17—Additional livestock on farms with hog enterprises in 1975 and 1980, by type and size of hog enterprise, and region<sup>1</sup>**

Type and size of enterprise and region, 1980 (head)	None			Beef cows			Stocker cattle			Cattle feeding			Dairy			Sheep			Poultry		
	75	80	Both	75	80	Both	75	80	Both	75	80	Both	75	80	Both	75	80	Both	75	80	Both
<i>Percent of farms</i>																					
<b>Feeder pig production:</b>																					
North Central—																					
100 to 199	0	0	0	100	100	100	32	32	32	0	0	0	0	0	0	0	0	0	0	0	0
200 to 499	67	69	64	18	13	13	6	6	6	6	6	6	5	5	5	6	6	6	15	18	15
500 to 999	34	45	34	46	29	29	0	3	0	23	11	11	13	13	13	0	0	0	13	13	13
1,000 to 1,999	46	68	46	2	3	2	21	1	1	25	22	20	8	8	8	0	3	0	0	0	0
2,000 to 4,999	31	39	31	48	47	47	0	0	0	17	8	8	0	0	0	9	9	9	7	0	0
5,000 & over	50	93	47	0	0	0	0	0	0	4	4	4	46	0	0	0	3	0	0	0	0
All	37	41	36	50	46	46	15	14	14	8	6	5	4	4	4	3	3	3	8	9	8
Southeast—																					
100 to 199	5	36	3	65	34	32	0	0	0	30	30	30	0	0	0	0	0	0	0	5	0
200 to 499	58	46	40	35	51	25	20	30	12	2	20	2	0	0	0	3	3	3	0	0	0
500 to 999	15	64	15	85	36	36	26	26	26	0	0	0	0	0	0	0	0	0	0	0	0
1,000 to 1,999	53	79	50	35	18	15	3	3	3	0	0	0	0	0	0	0	0	0	13	4	4
2,000 to 4,999	44	50	44	50	43	41	6	6	6	16	16	16	3	3	3	2	0	0	2	0	0
5,000 & over	50	50	50	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	50	50
All	26	44	19	55	39	29	9	12	6	17	23	17	*	*	*	1	1	1	1	3	*
Both regions, all sizes	35	41	33	51	45	43	14	14	13	9	8	7	4	4	4	2	2	2	7	8	7
<b>Farrow-to-finish:</b>																					
North Central—																					
100 to 199	20	21	20	49	49	49	8	16	6	30	33	30	36	20	20	5	6	5	3	5	3
200 to 499	8	17	6	47	55	44	9	6	6	53	33	32	20	17	17	10	12	9	10	11	10
500 to 999	18	26	14	55	48	48	15	12	12	36	30	26	6	2	2	6	8	1	6	8	6
1,000 to 1,999	30	40	30	29	36	29	12	16	11	38	30	24	7	6	6	3	3	3	11	2	2
2,000 to 4,999	62	68	61	27	22	20	1	1	*	26	23	22	3	3	3	2	2	2	3	3	3
5,000 & over	75	76	71	11	9	5	5	0	0	17	16	16	1	0	0	8	3	3	1	1	1
All	17	22	15	47	49	45	10	11	7	41	32	30	21	14	14	6	8	6	7	8	6

See footnotes at end of table.

Continued

**Appendix table 17—Additional livestock on farms with hog enterprises in 1975 and 1980, by type and size of hog enterprise, and region<sup>1</sup>—Continued**

Type and size of enterprise and region, 1980 (head)	None			Beef cows			Stocker cattle			Cattle feeding			Dairy			Sheep			Poultry		
	75	80	Both	75	80	Both	75	80	Both	75	80	Both	75	80	Both	75	80	Both	75	80	Both
<i>Percent of farms</i>																					
Southeast—				53	45	43	10	10	10	13	15	13	0	0	0	4	1	1	7	7	7
100 to 199	42	50	40	66	65	64	13	10	10	14	18	14	3	0	0	0	1	0	13	8	7
200 to 499	25	32	24	63	61	55	7	7	7	6	7	5	2	0	0	2	1	1	1	4	0
500 to 999	34	35	26	51	38	35	9	9	9	9	10	9	2	1	1	0	0	0	6	4	4
1,000 to 1,999	46	59	44	57	51	50	12	12	10	8	5	5	3	3	3	0	0	0	5	0	0
2,000 to 4,999	37	42	36	46	45	43	3	5	3	1	3	1	0	0	0	0	0	0	5	9	5
5,000 & over	50	52	48	58	53	51	11	10	10	12	14	12	1	*	*	2	1	1	8	6	6
All	36	42	33																		
Both regions, all sizes	19	25	17	49	50	45	10	11	7	38	30	28	19	13	13	6	8	5	7	8	6
<b>Feeder pig finishing:</b>																					
North Central—																					
100 to 199	13	16	13	49	59	49	0	0	0	43	40	40	19	9	9	6	0	0	10	0	0
200 to 499	10	24	10	45	42	42	14	15	11	76	51	51	23	20	20	0	0	0	25	25	25
500 to 999	24	31	24	35	35	33	12	13	12	63	60	57	12	12	12	5	8	4	12	12	12
1,000 to 1,999	38	36	30	37	35	31	10	8	8	45	41	38	11	7	1	0	0	0	2	2	2
2,000 to 4,999	31	31	21	6	11	4	8	22	8	38	39	29	4	4	4	1	3	1	20	19	19
5,000 & over	48	79	48	37	11	11	6	6	6	50	22	22	2	0	0	23	0	0	0	0	0
All	17	24	16	43	45	41	9	9	7	59	48	47	18	13	13	3	2	1	15	12	12
Southeast—																					
100 to 199	0	0	0	79	79	79	0	0	0	0	0	0	21	21	21	0	0	0	9	9	9
200 to 499	50	50	48	45	43	43	5	5	5	4	6	4	2	0	0	0	0	0	6	6	6
500 to 999	43	38	35	49	57	49	21	9	9	17	17	17	1	1	1	0	0	0	3	0	0
1,000 to 1,999	42	48	39	48	44	41	10	18	10	2	10	2	0	0	0	0	0	0	17	10	10
2,000 to 4,999	35	48	35	56	40	36	14	12	12	17	11	11	3	3	3	0	5	0	16	13	13
5,000 & over	68	68	58	25	27	18	3	8	3	11	13	3	4	4	4	0	0	0	3	0	0
All	23	23	21	64	63	62	4	3	3	3	4	4	12	11	11	0	*	0	8	7	7
Both regions, all sizes	18	24	17	46	48	44	8	8	7	50	41	40	17	13	12	3	1	1	14	11	11
All farms, all regions	22	28	20	49	48	45	11	11	8	34	27	26	15	11	11	4	5	4	8	8	7

<sup>1</sup>Less than 0.5 percent.

<sup>2</sup>Data indicate the percentage of farms having the specified livestock enterprises in 1975, 1980 and both years. All farms included here produced hogs in 1980, but some produced no hogs in 1975 (app. table 11). Farms not in business in 1975 are excluded from this summary.



Appendix table 18—Sources of gross farm income on farms with feeder pig production enterprises, by size of hog enterprise and region, 1980

Farm enterprise	100 to 199	200 to 499	500 to 999	1,000 to 1,999	2,000 to 4,999	5,000 & over	All sizes
<i>Percent of gross income</i>							
<b>North Central:</b>							
Crops <sup>1</sup> —							
Corn	0	43	9	15	10	1	27
Soybeans	13	33	23	23	10	*	26
Wheat	0	1	4	2	*	*	2
Other crops	0	1	*	*	3	*	1
Total crops	13	78	36	40	23	1	56
Livestock <sup>2</sup>							
Hogs & pigs	35	18	45	55	69	98	33
Beef cattle <sup>3</sup>	52	2	11	4	8	1	9
Dairy	0	2	8	1	0	0	2
Other livestock <sup>4</sup>	0	*	0	*	*	0	*
Total livestock	87	22	64	60	77	99	44
Total farm:							
Percent	100	100	100	100	100	100	100
\$1,000	18	83	59	100	162	345	61
<b>Southeast:</b>							
Crops <sup>1</sup> —							
Corn	6	2	0	2	4	0	3
Soybeans	1	22	24	6	5	2	11
Wheat	0	1	1	1	1	1	1
Tobacco, cotton, & peanuts	28	26	2	26	19	0	19
Other crops	5	3	3	1	1	4	3
Total crops	40	54	30	36	30	7	37
Livestock <sup>2</sup>							
Hogs & pigs	34	41	67	62	67	91	54
Beef cattle <sup>3</sup>	26	5	1	2	1	0	8
Dairy	0	0	0	0	2	0	*
Other livestock	0	*	2	*	0	2	1
Total livestock	60	46	70	64	70	93	63
Total farm:							
Percent	100	100	100	100	100	100	100
\$1,000	17	31	46	86	192	707	36

\*Less than 0.5 percent.

<sup>1</sup>Gross income is from sales of crops at State average yields and prices for 1980. Respondents were limited to listing their five most important crops in 1980, so sales could have been larger to the extent that more than five crops were produced from which products were sold. The possible effect of this constraint is considered to be quite small. The value of crops fed to livestock is not included.

<sup>2</sup>Gross income is from livestock and livestock products sold, or the market value of livestock transferred from one enterprise to another, minus the cost of purchased feeder animals, or the market value of feeder animals transferred from one enterprise to another. For example, the cost of purchased feeder cattle is deducted from the receipts from the sale of fed cattle. Beef cow enterprises are credited with the market value of feeder animals produced and fed to slaughter weight on the same farm; receipts from sales of fed cattle are charged with the value of home-raised feeders.

<sup>3</sup>Includes beef cow, stocker, and cattle-feeding enterprises.

<sup>4</sup>Includes all other livestock and poultry.

Appendix table 19—Sources of gross farm income on farms with farrow-to-finish hog enterprises, by size of hog enterprise and region, 1980

Farm enterprise	100 to 199	200 to 499	500 to 999	1,000 to 1,999	2,000 to 4,999	5,000 & over	All sizes
<i>Percent of gross income</i>							
<b>North Central:</b>							
Crops <sup>1</sup> —							
Corn	19	19	11	11	10	3	15
Soybeans	14	15	14	10	14	4	14
Wheat	2	3	1	2	1	1	2
Other crops	8	3	1	2	*	*	2
Total crops	43	40	27	25	25	8	33
Livestock <sup>2</sup> —							
Hogs & pigs	22	32	34	57	69	86	38
Beef cattle <sup>3</sup>	14	14	38	15	6	6	19
Dairy	21	13	1	3	*	0	9
Other livestock <sup>4</sup>	*	1	*	*	*	*	1
Total livestock	57	60	73	75	75	92	67
Total farm:							
Percent	100	100	100	100	100	100	100
\$1,000	63	98	187	219	439	906	120
<b>Southeast:</b>							
Crops <sup>1</sup> —							
Corn	6	7	10	3	*	2	6
Soybeans	24	14	99	10	5	3	14
Wheat	3	2	2	1	1	*	2
Tobacco, cotton, & peanuts	28	24	21	12	12	8	21
Other crops	2	2	2	2	1	*	1
Total crops	63	49	44	28	19	13	44
Livestock <sup>2</sup> —							
Hogs & pigs	28	38	47	65	70	82	46
Beef cattle <sup>3</sup>	8	11	8	6	9	3	9
Dairy	0	*	0	1	2	0	*
Other livestock <sup>4</sup>	1	2	1	*	*	2	1
Total livestock	37	51	56	72	81	87	56
Total farm:							
Percent	100	100	100	100	100	100	100
\$1,000	49	77	139	200	396	1,098	89

\*Less than 0.5 percent.

See appendix table 18 for footnotes.

Appendix table 20—Sources of gross farm income on farms with feeder pig finishing enterprises, by size of hog enterprise and region, 1980

Farm enterprise	100 to 199	200 to 499	500 to 999	1,000 to 1,999	2,000 to 4,999	5,000 & over	All sizes
<i>Percent of gross income</i>							
<b>North Central:</b>							
Crops <sup>1</sup> —							
Corn	25	31	28	22	11	6	27
Soybeans	36	32	18	17	12	11	27
Wheat	4	8	5	2	3	*	6
Other crops	3	3	2	1	1	*	3
Total crops	68	74	53	42	27	17	63
Livestock <sup>2</sup> —							
Hogs & pigs	18	11	29	31	61	81	20
Beef cattle <sup>3</sup>	12	8	13	27	3	2	12
Dairy	2	7	5	*	*	0	5
Other livestock <sup>4</sup>	0	*	*	*	9	0	*
Total livestock	32	26	47	58	73	83	37
Total farm:							
Percent	100	100	100	100	100	100	100
\$1,000	51	188	162	264	285	578	147
<b>Southeast:</b>							
Crops <sup>1</sup> —							
Corn	8	7	4	6	1	2	6
Soybeans	24	16	12	17	9	3	16
Wheat	3	1	3	5	1	2	2
Tobacco, cotton, & peanuts	1	47	12	11	9	0	20
Other crops	0	2	3	7	*	0	3
Total crops	36	73	34	46	20	7	47
Livestock <sup>2</sup> —							
Hogs & pigs	15	20	44	48	68	90	33
Beef cattle <sup>3</sup>	6	4	21	6	2	2	7
Dairy	41	0	1	0	1	1	12
Other livestock <sup>4</sup>	2	3	0	*	9	0	1
Total livestock	64	27	66	54	80	93	53
Total farm:							
Percent	100	100	100	100	100	100	100
\$1,000	44	85	104	122	268	819	77

See appendix table 18 for footnotes.

Appendix table 21—Land tenure arrangements in hog farming, by type and size of hog enterprise and region, 1980

Region and size of enterprise (head)	Feeder pig production			Farrow-to-finish			Feeder pig finishing		
	Owner operated	Part owned	Rented	Owner operated	Part owned	Rented	Owned operated	Part owned	Rented
<i>Percent of farms</i>									
North Central:									
100 to 199	0	63	37	34	49	17	45	24	31
200 to 499	40	60	0	17	67	16	32	68	0
500 to 999	53	40	7	21	60	19	24	66	10
1,000 to 1,999	21	52	27	16	72	12	26	67	7
2,000 to 4,999	27	67	6	11	88	1	14	68	18
5,000 & over	95	5	0	41	43	16	31	69	0
All	27	57	16	24	60	16	34	53	13
Southeast:									
100 to 199	61	39	0	25	73	2	35	65	0
200 to 499	42	58	0	23	70	7	22	63	15
500 to 999	32	68	0	19	71	10	35	57	8
1,000 to 1,999	29	57	14	25	73	2	36	62	2
2,000 to 4,999	60	40	0	33	61	6	43	54	3
5,000 & over	38	62	0	58	39	3	77	20	3
All	50	49	1	24	71	5	31	63	6
Both regions, all sizes	31	56	13	23	62	15	33	55	12

Appendix table 22—Types of business organization in hog farming by type and size of hog enterprise and region, 1980<sup>1</sup>

Type and size of enterprise and region (head)	Sole proprietorship	General partnership	Limited partnership	Standard C family corp.	Standard C nonfamily corp.	Subchapter S family corp.	Subchapter S nonfamily corp.	Cooperative	Other
<i>Percent of farms</i>									
<b>Feeder pig production:</b>									
North Central—									
100 to 199	69.1	30.9	0	0	0	0	0	0	0
200 to 499	97.1	2.9	0	0	0	0	0	0	0
500 to 999	97.2	2.8	0	0	0	0	0	0	0
1,000 to 1,999	90.4	9.6	0	0	0	0	0	0	0
2,000 to 4,999	66.9	19.3	12.8	1.0	0	0	0	0	0
5,000 & over	0	6.5	0	5.4	9.2	2.9	43.2	32.8	0
All	86.3	13.1	.3	*	*	*	.2	.1	0
Southeast—									
100 to 199	98.4	1.6	0	0	0	0	0	0	0
200 to 499	91.5	8.5	0	0	0	0	0	0	0
500 to 999	53.8	45.2	1.0	0	0	0	0	0	0
1,000 to 1,999	62.1	37.9	0	0	0	0	0	0	0
2,000 to 4,999	87.8	7.9	1.3	3.0	0	0	0	0	0
5,000 & over	31.3	0	0	31.2	0	37.5	0	0	0
All	89.1	10.3	.1	.3	0	.2	0	0	0
Both regions, all sizes									
	86.8	12.6	.2	.1	*	.1	.1	.1	0
<b>Farrow-to-finish:</b>									
North Central—									
100 to 199	88.0	10.6	0	1.4	0	0	0	0	0
200 to 499	84.6	9.8	2.5	3.1	0	0	0	0	0
500 to 999	71.7	23.9	.7	3.4	0	.3	0	0	0
1,000 to 1,999	66.6	29.1	.9	1.8	0	1.6	0	0	0
2,000 to 4,999	29.4	57.4	.6	6.0	0	5.9	.7	0	0
5,000 & over	12.9	20.4	6.4	23.3	7.8	8.5	13.2	7.5	0
All	80.9	14.8	11.3	2.6	*	.3	.1	*	0

See footnotes at end of table.

Continued

Appendix table 22—Types of business organization in hog farming by type and size of hog enterprise and region, 1980<sup>1</sup>—Continued

Type and size of enterprise and region (head)	Sole proprietorship	General partnership	Limited partnership	Standard C family corp.	Standard C nonfamily corp.	Subchapter S family corp.	Subchapter S nonfamily corp.	Cooperative	Other
Percent of farms									
Southeast—									
100 to 199	84.6	11.3	0	4.1	0	0	0	0	0
200 to 499	86.5	11.7	.8	.6	0	.4	0	0	0
500 to 999	56.6	36.3	0	2.2	0	1.8	0	0	3.1
1,000 to 1,999	64.4	24.9	3.4	3.6	0	2.9	0	0	.8
2,000 to 4,999	47.5	29.0	2.8	17.0	0	1.7	0	0	.6
5,000 & over	21.5	24.6	1.7	24.6	15.9	2.9	7.7	1.1	0
All	80.1	15.2	.5	3.1	.1	.5	.1	*	.4
Both regions, all sizes	80.8	14.8	1.1	2.9	*	.3	.1	*	*
Feeder pig finishing:									
North Central—									
100 to 199	96.6	0	3.4	0	0	0	0	0	0
200 to 499	72.4	9.2	8.2	10.2	0	0	0	0	0
500 to 999	73.9	18.9	0	6.3	0	.2	0	0	.7
1,000 to 1,999	59.7	19.5	0	11.4	8.4	1.0	0	0	0
2,000 to 4,999	41.9	47.6	4.1	4.6	1.0	0	.8	0	0
5,000 & over	41.9	27.0	0	26.3	0	0	4.8	0	0
All	79.1	9.3	4.5	6.2	.7	.1	*	0	.1
Southeast—									
100 to 199	88.8	11.2	0	0	0	0	0	0	0
200 to 499	70.9	28.3	0	.8	0	0	0	0	0
500 to 999	73.8	26.2	0	0	0	0	0	0	0
1,000 to 1,999	67.6	17.2	0	13.7	1.5	0	0	0	0
2,000 to 4,999	74.3	16.8	2.5	5.4	0	1.0	0	0	0
5,000 & over	30.7	33.0	4.0	22.8	3.5	3.4	0	2.6	0
All	79.7	18.9	.1	1.2	.1	*	0	*	0
Both regions, all sizes	79.2	10.7	3.9	5.5	.5	.1	*	0	.1
All types, sizes, regions	81.7	13.5	1.5	2.7	.2	.2	.1	*	.1

\*Less than 0.05 percent.

Appendix table 23—Types of breeding stock bought per farm buying breeding stock, by type and size of hog enterprise and region, 1980

Type and size of enterprise and region (head)	Sows	Bred gilts	Other gilts	Boars
<i>Head per farm<sup>1</sup></i>				
Feeder pig production:				
North Central—				
100 to 199	*	*	*	*
200 to 499	21	*	8	2.3
500 to 999	8	10	30	2.4
1,000 to 1,999	47	60	47	6.0
2,000 to 4,999	*	*	37	4.6
5,000 & over	32	*	173	12.9
All	21	44	13	2.8
Southeast—				
100 to 199	11	15	4	1.1
200 to 499	3	10	50	1.3
500 to 999	10	2	46	2.4
1,000 to 1,999	82	15	16	3.4
2,000 to 4,999	25	71	49	6.0
5,000 & over	*	*	70	10.7
All	13	15	34	1.6
Both regions, all sizes	21	34	15	2.6
Farrow-to-finish:				
North Central—				
100 to 199	8	4	7	1.4
200 to 499	15	10	30	2.0
500 to 999	11	16	12	2.5
1,000 to 1,999	17	30	33	4.8
2,000 to 4,999	30	30	24	11.7
5,000 & over	2	16	184	17.4
All	10	8	24	2.5
Southeast—				
100 to 199	4	8	4	1.1
200 to 499	8	14	12	1.7
500 to 999	10	4	22	2.9
1,000 to 1,999	50	4	29	4.1
2,000 to 4,999	77	16	17	6.6
5,000 & over	120	*	233	22.2
All	8	11	16	2.2
Both regions, all sizes	10	8	22	2.5

\*No breeding stock purchased.

<sup>1</sup>Average numbers purchased are based on farms buying the specified kind of breeding stock.

Appendix table 24—Litters from first-litter gilts, by type and size of hog enterprise and region, 1980<sup>1</sup>

Type and size of enterprise and region (head)	Litters farrowed by first-litter gilts	Proportion of litters from first-litter gilts				
		None	1-19 percent	20-39 percent	40-59 percent	60 percent and over
		Percent of litters	Percent of farms			
Feeder pig production:						
North Central—						
100 to 199	22	0	69	0	31	0
200 to 499	22	17	34	36	10	3
500 to 999	13	44	25	24	0	7
1,000 to 1,999	39	1	33	32	20	14
2,000 to 4,999	18	0	62	37	1	0
5,000 & over	22	0	55	37	8	0
All	22	14	45	22	16	3
Southeast—						
100 to 199	10	21	65	14	0	0
200 to 499	6	68	18	10	4	0
500 to 999	20	11	52	36	0	1
1,000 to 1,999	18	27	30	29	14	0
2,000 to 4,999	23	2	71	16	2	9
5,000 & over	14	31	31	38	0	0
All	14	35	47	16	2	*
Both regions, all sizes	21	18	45	21	13	3
Farrow-to-finish:						
North Central—						
100 to 199	31	26	10	35	16	13
200 to 499	30	45	5	22	11	17
500 to 999	25	24	20	39	9	8
1,000 to 1,999	24	24	28	27	14	7
2,000 to 4,999	20	2	67	20	9	2
5,000 & over	31	5	31	47	10	7
All	27	67	12	30	12	13
Southeast—						
100 to 199	18	37	27	17	10	9
200 to 499	14	30	29	32	8	1
500 to 999	21	14	47	30	7	2
1,000 to 1,999	18	3	62	27	8	0
2,000 to 4,999	19	3	59	31	4	3
5,000 & over	19	8	54	33	2	3
All	18	30	32	24	9	5
Both regions, all sizes	26	32	15	29	12	12

\*Less than 0.5 percent.

<sup>1</sup>A first litter gilt is a female having her first litter of pigs. All other litters come from sows which have already had at least one litter of pigs.



Appendix table 25—Seasonal distribution of farrowings, by type and size of hog enterprise and region, 1980<sup>1</sup>

Region and size of enterprise (head)	Feeder pig production				Farrow-to-finish			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<i>Percent of litters farrowed</i>								
North Central:								
100 to 199	37	13	19	31	18	33	24	25
200 to 499	24	19	32	25	28	25	30	17
500 to 999	24	25	26	25	26	27	26	21
1,000 to 1,999	26	25	25	24	25	29	24	22
2,000 to 4,999	24	26	24	26	25	25	26	24
5,000 & over	25	25	25	25	24	25	26	25
All	26	22	27	25	25	27	27	21
Southeast:								
100 to 199	43	14	36	7	32	20	30	18
200 to 499	30	28	22	20	29	23	27	21
500 to 999	20	28	25	27	26	26	25	23
1,000 to 1,999	24	24	25	27	26	25	26	23
2,000 to 4,999	24	25	26	25	25	26	25	24
5,000 & over	25	25	25	25	25	25	25	25
All	28	24	26	22	28	24	26	22

<sup>1</sup>Q1 is January through March of 1980, with subsequent 3-month periods following in order.Appendix table 26—Seasonal distribution of purchases of feeder pig by feeder pig finishers, by size of hog enterprise and region, 1980<sup>1</sup>

Size of enterprise (head)	North Central				Southeast			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<i>Percent of pigs purchased</i>								
100 to 199	12	13	54	21	17	34	28	24
200 to 499	15	33	19	33	22	28	30	20
500 to 999	24	25	27	24	20	29	21	30
1,000 to 1,999	26	25	25	24	16	14	57	13
2,000 to 4,999	25	26	25	24	24	24	25	27
5,000 & over	26	23	27	24	25	25	27	23
All	21	26	27	26	20	25	33	22

<sup>1</sup>Q1 is January through March of 1980, with subsequent 3-month periods following in order.

**Appendix table 27—Average annual payment to hired managers employed in hog operations, by type and size of hog enterprise and region, 1980<sup>1</sup>**

Size of enterprise (head)	Feeder pig production		Farrow-to-finish		Feeder pig finishing	
	North Central	Southeast	North Central	Southeast	North Central	Southeast
<i>Dollars per year</i>						
100 to 199	*	*	*	*	*	*
200 to 499	*	*	17,000	*	*	*
500 to 999	*	10,500	*	13,200	18,000	*
1,000 to 1,999	*	14,300	21,500	10,500	25,000	16,200
2,000 to 4,999	*	11,800	14,800	14,300	15,700	16,200
5,000 & over	20,850	*	26,400	17,200	20,000	13,900
All	20,850	12,600	18,000	13,700	23,400	15,800

\*No hired management.

<sup>1</sup>Payment is that for the highest paid hired manager and includes cash salary, any share of returns, and the value of items furnished.

**Appendix table 28—Tractor use in hog production, by type of fuel, type and size of hog enterprise, and region, 1980**

Type and size of enterprise (head)	North Central			Southeast		
	Gasoline	Diesel	LP gas	Gasoline	Diesel	LP gas
<i>Percent of horsepower hours</i>						
Feeder pig production:						
100 to 199	92	8	0	23	77	0
200 to 499	81	19	0	8	92	0
500 to 999	55	45	*	14	86	0
1,000 to 1,999	32	57	11	9	91	0
2,000 to 4,999	45	55	*	14	85	1
5,000 & over	41	59	0	5	95	0
All	69	29	2	12	88	*
Farrow-to-finish:						
100 to 199	48	52	0	20	80	0
200 to 499	33	67	0	4	96	0
500 to 999	34	66	*	10	90	*
1,000 to 1,999	28	71	1	13	87	0
2,000 to 4,999	11	82	7	5	95	0
5,000 & over	19	80	1	9	91	0
All	33	66	1	10	90	*
Feeder pig finishing:						
100 to 199	67	21	12	33	67	0
200 to 499	12	88	0	7	91	2
500 to 999	42	58	0	17	82	1
1,000 to 1,999	35	64	1	14	86	0
2,000 to 4,999	13	87	0	5	95	*
5,000 & over	10	90	0	6	94	0
All	31	68	1	17	82	1

\*Less than 0.5 percent.

**Appendix table 29—Source of energy for heat in hog production, by type and size of hog enterprise and region, 1980<sup>1</sup>**

Type and size of enterprise and region (head)	No heat used	LP gas	Natural gas	Fuel oil	Electricity	Other
<i>Percent of farms</i>						
<b>Feeder pig production:</b>						
North Central—						
100 to 199	0	0	0	0	100	0
200 to 499	6	76	0	0	18	0
500 to 999	2	49	0	5	41	3
1,000 to 1,999	2	78	0	5	14	1
2,000 to 4,999	2	52	4	24	18	0
5,000 & over	3	46	24	0	27	0
All	3	46	*	2	49	*
Southeast—						
100 to 199	5	9	30	0	56	0
200 to 499	8	22	2	0	61	7
500 to 999	21	20	0	5	54	0
1,000 to 1,999	0	19	0	2	79	0
2,000 to 4,999	0	49	0	1	49	1
5,000 & over	0	0	0	0	100	0
All	7	16	15	1	59	2
Both regions, all sizes	3	41	3	1	51	1
<b>Farrow-to-finish:</b>						
North Central—						
100 to 199	41	11	0	3	44	1
200 to 499	24	21	1	17	37	0
500 to 999	7	50	3	4	36	0
1,000 to 1,999	4	71	2	9	14	0
2,000 to 4,999	0	91	3	1	5	0
5,000 & over	5	68	9	0	15	3
All	25	28	1	9	37	*
Southeast—						
100 to 199	32	1	0	0	67	0
200 to 499	33	16	0	0	49	2
500 to 999	13	23	0	4	60	0
1,000 to 1,999	1	33	0	0	60	0
2,000 to 4,999	7	37	0	1	59	2
5,000 & over	0	41	0	0	57	2
All	28	11	0	*	60	1
Both regions, all sizes	25	26	1	9	39	*
<b>Feeder pig finishing:</b>						
North Central—						
100 to 199	79	0	0	0	21	0
200 to 499	85	5	0	0	10	0
500 to 999	48	34	0	2	16	0
1,000 to 1,999	34	34	3	0	29	0
2,000 to 4,999	49	38	2	1	10	0
5,000 & over	15	70	0	5	10	0
All	72	11	*	*	17	0
Southeast—						
100 to 199	28	0	0	0	72	0
200 to 499	67	0	0	0	33	0
500 to 999	58	4	2	0	36	0
1,000 to 1,999	59	3	0	0	38	0
2,000 to 4,999	56	8	2	2	32	0
5,000 & over	45	12	0	0	43	0
All	46	1	*	*	53	0
Both regions, all sizes	68	10	*	*	22	0
All farms, all regions	30	26	1	5	38	*

\*Less than 0.5 percent.

<sup>1</sup>Producers indicated the source of energy that provided the largest part of the heat used for their hogs. Solar energy collected via systems constructed especially to capture and use solar energy was not the major source of heat on any of the farms in the sample.

**Appendix table 30—Tractor use in hog production, by type and size of hog enterprise and region, 1980<sup>1</sup>**

Type and size of enterprise (head)	North Central		Southeast	
	Actual tractor use	Tractor horsepower hours <sup>2</sup>	Actual tractor use	Tractor horsepower hours <sup>2</sup>
<i>Hours per litter</i>				
<b>Feeder pig production:</b>				
100 to 199	4.18	340	1.36	69
200 to 499	3.19	182	1.73	83
500 to 999	1.89	94	2.57	129
1,000 to 1,999	1.66	108	1.59	97
2,000 to 4,999	1.10	61	1.03	50
5,000 & over	.23	17	.41	22
All	2.31	139	1.39	71
<b>Farrow-to-finish:</b>				
100 to 199	4.10	268	5.37	261
200 to 499	4.17	267	4.77	278
500 to 999	4.00	280	2.88	195
1,000 to 1,999	2.34	170	1.96	133
2,000 to 4,999	.89	83	1.56	105
5,000 & over	.66	62	.63	47
All	3.11	214	3.28	193
<i>Hours per head</i>				
<b>Feeder pig finishing:</b>				
100 to 199	.06	30	.46	26
200 to 499	.51	46	.22	16
500 to 999	.53	38	.30	21
1,000 to 1,999	.25	18	.14	9
2,000 to 4,999	.16	16	.18	12
5,000 & over	.15	15	.09	6
All	.44	32	.24	16

<sup>1</sup>Tractor time includes all tractor use for activities related to hog production including spreading manure. Time for production, harvesting, and storing of feed crops is not included. The averages pertain to all farms with and without tractor use. Self-propelled skid loaders for cleaning lots and buildings are not included in tractor use.

<sup>2</sup>Actual tractor use times size of tractors in horsepower.

**Appendix table 31—Truck use for hog production by type and size of hog enterprise and region, 1980<sup>1</sup>**

Type and size of enterprise (head)	North Central		Southeast	
	Actual truck use	Truck ton miles <sup>2</sup>	Actual truck use	Truck ton miles <sup>2</sup>
<i>Miles per litter</i>				
<b>Feeder pig production:</b>				
100 to 199	38	41	106	80
200 to 499	31	23	68	56
500 to 999	32	25	61	68
1,000 to 1,999	29	22	58	46
2,000 to 4,999	13	17	18	20
5,000 & over	4	3	6	8
All	28	24	52	46
<b>Farrow-to-finish:</b>				
100 to 199	58	56	115	95
200 to 499	38	35	86	72
500 to 999	38	39	51	53
1,000 to 1,999	37	36	56	55
2,000 to 4,999	19	39	37	43
5,000 & over	13	31	17	25
All	36	39	65	60
<i>Miles per head</i>				
<b>Feeder pig finishing:</b>				
100 to 199	11	8	7	6
200 to 499	6	8	3	3
500 to 999	4	6	10	11
1,000 to 1,999	6	8	5	10
2,000 to 4,999	3	5	4	12
5,000 & over	1	2	2	9
All	5	7	5	8

<sup>1</sup>Truck mileage is for owned or rented trucks, and includes all uses for hog production related activities, including the hauling of supplies and hogs or pigs to the farm, and hauling hogs or pigs to market. Custom hauling is not included. The averages pertain to all farms with and without truck use.

<sup>2</sup>Actual miles driven times size of trucks in tons.

**Appendix table 32—Grain fed to hogs that was ensiled or treated high-moisture grain, by type and size of hog enterprise, and region, 1980<sup>1</sup>**

Size of enterprise (head)	Feeder pig production		Farrow-to-finish		Feeder pig finishing	
	North Central	Southeast	North Central	Southeast	North Central	Southeast
<i>Percent of all grains fed</i>						
100 to 199	0	0	*	2	5	0
200 to 499	0	0	3	2	2	0
500 to 999	1	0	6	5	13	0
1,000 to 1,999	3	0	16	3	11	2
2,000 to 4,999	1	0	5	2	6	6
5,000 & over	1	0	6	7	1	1
All	1	0	7	3	7	1

\*Less than 0.5 percent.

<sup>1</sup>Includes all grain fed to hogs regardless of kind of ration or place of processing of feeds. Ensiled or treated high-moisture grain contains too much moisture to keep as dry grain. It is commonly ensiled, but may be preserved with an organic acid.

**Appendix table 33—Source of protein supplement for major hog ration, by type and size of hog enterprise and region, 1980<sup>1</sup>**

Type and size of enterprise and region (head)	Purchased commercial supplement	Soybean meal and mixing concentrate <sup>2</sup>	Soybean meal and separate additives <sup>3</sup>	Purchased complete ration <sup>4</sup>	Other
<i>Percent of supplement</i>					
<b>Feeder pig production:</b>					
North Central—					
100 to 199	0	20	0	80	0
200 to 499	75	2	0	23	0
500 to 999	30	36	2	32	0
1,000 to 1,999	27	44	1	28	0
2,000 to 4,999	37	28	14	21	0
5,000 & over	2	19	0	79	0
All	38	24	2	36	0
Southeast—					
100 to 199	9	5	9	44	33
200 to 499	50	36	2	12	0
500 to 999	16	16	15	53	0
1,000 to 1,999	29	45	8	18	0
2,000 to 4,999	18	52	2	28	0
5,000 & over	17	31	0	52	0
All	24	31	5	35	5
Both regions, all sizes	36	25	3	35	1
<b>Farrow-to-finish:</b>					
North Central—					
100 to 199	63	11	9	17	0
200 to 499	66	15	4	15	0
500 to 999	57	34	0	9	0
1,000 to 1,999	56	24	8	12	0
2,000 to 4,999	25	27	44	4	0
5,000 & over	13	52	26	9	0
All	53	25	11	11	0
Southeast—					
100 to 199	49	28	2	21	0
200 to 499	55	28	8	9	0
500 to 999	41	40	11	8	0
1,000 to 1,999	37	36	7	20	0
2,000 to 4,999	29	39	21	11	0
5,000 & over	27	40	12	21	0
All	41	35	10	14	0
Both regions, all sizes	52	26	11	11	0
<b>Feeder pig finishing:</b>					
North Central—					
100 to 199	22	33	23	22	0
200 to 499	53	24	3	20	0
500 to 999	76	17	3	4	0
1,000 to 1,999	53	25	9	13	0
2,000 to 4,999	29	45	3	23	0
5,000 & over	41	43	3	13	0
All	52	27	6	15	0
Southeast—					
100 to 199	38	0	0	62	0
200 to 499	62	18	2	18	0
500 to 999	44	28	18	10	0
1,000 to 1,999	38	18	18	26	0
2,000 to 4,999	41	31	7	21	0
5,000 & over	20	2	50	28	0
All	41	17	16	26	0
Both regions, all sizes	51	25	8	16	0

<sup>1</sup>Less than 0.5 percent.

<sup>2</sup>The major hog ration was the one representing the largest amount of feed fed.

<sup>3</sup>Soybean meal plus a purchased mixing concentrate (sometimes called a premix) containing necessary additives.

<sup>4</sup>Soybean meal plus salt, minerals, vitamins, and other ingredients purchased and added separately.

<sup>5</sup>Protein supplement is part of a purchased complete ration.

**Appendix table 34—Method of processing feedstuffs in major hog rations, by type and size of hog enterprise and region, 1980<sup>1</sup>**

Type and size of enterprise and region (head)	No processing	Tractor mill, on-farm	Electric mill, on-farm	Custom processed <sup>2</sup>
<b>Feeder pig production:</b>				
<i>Percent of feedstuffs</i>				
North Central—				
100 to 199	0	0	0	0
200 to 499	36	9	0	55
500 to 999	1	39	4	56
1,000 to 1,999	0	51	0	49
2,000 to 4,999	0	62	0	38
5,000 & over	0	1	5	94
All	11	29	1	59
Southeast—				
100 to 199	35	11	3	51
200 to 499	29	54	0	17
500 to 999	5	24	7	64
1,000 to 1,999	0	45	21	34
2,000 to 4,999	4	28	28	40
5,000 & over	0	48	0	52
All	13	37	8	42
Both regions, all sizes	11	30	2	57
<b>Farrow-to-finish:</b>				
North Central—				
100 to 199	6	54	1	39
200 to 499	3	80	1	16
500 to 999	4	76	4	16
1,000 to 1,999	1	60	27	12
2,000 to 4,999	*	21	71	6
5,000 & over	0	2	81	17
All	2	60	21	17
Southeast—				
100 to 199	20	41	0	39
200 to 499	1	75	4	20
500 to 999	3	71	14	12
1,000 to 1,999	0	53	34	13
2,000 to 4,999	0	23	65	12
5,000 & over	0	7	62	31
All	4	48	27	21
Both regions, all sizes	3	59	21	17
<b>Feeder pig finishing:</b>				
North Central—				
100 to 199	0	76	0	24
200 to 499	0	70	7	23
500 to 999	3	68	17	12
1,000 to 1,999	0	48	22	30
2,000 to 4,999	0	61	12	27
5,000 & over	0	31	54	15
All	1	62	15	22
Southeast—				
100 to 199	0	37	0	63
200 to 499	12	60	2	26
500 to 999	8	59	19	14
1,000 to 1,999	0	29	37	34
2,000 to 4,999	0	23	43	34
5,000 & over	0	7	35	58
All	4	37	22	37
Both regions, all sizes	1	59	16	24

\*Less than 0.5 percent.

<sup>1</sup>The major ration is the one accounting for the largest part of total feeds fed to hogs.

<sup>2</sup>Custom processing includes processing farm-grown or purchased grains for a fee either at the farm or the custom mill and the processing of purchased complete rations.

Appendix table 35—Types of equipment used for feed processing and distribution, by type and size of hog enterprise and region, 1980

Type and size of enterprise and region (head)	Mobile grinder-mixer <sup>1</sup>	Stationary grinder mixer <sup>1</sup>	Any type of feed mill <sup>2</sup>	Feed mixer <sup>3</sup>	Premixer <sup>4</sup>	Self-unloading feed wagon or truck <sup>5</sup>	Feed conveying system <sup>6</sup>	Self-unloading wagon and conveying system
<i>Percent of farms</i>								
<b>Feeder pig production:</b>								
North Central—								
100 to 199	0	0	0	0	0	0	0	0
200 to 499	16	0	19	0	0	31	38	25
500 to 999	40	12	52	0	0	14	6	0
1,000 to 1,999	45	13	49	5	0	32	29	13
2,000 to 4,999	62	0	75	0	0	31	23	0
5,000 & over	1	0	5	0	0	7	67	7
All	18	3	21	*	0	18	19	11
Southeast—								
100 to 199	9	0	9	4	0	12	12	12
200 to 499	57	0	57	0	0	2	0	0
500 to 999	57	5	63	0	0	0	27	0
1,000 to 1,999	48	20	68	0	0	33	50	17
2,000 to 4,999	31	19	52	7	10	22	58	11
5,000 & over	31	31	62	0	0	31	69	0
All	32	2	34	2	*	9	13	7
Both regions, all sizes	20	3	24	1	*	16	18	10
<b>Farrow-to-finish:</b>								
North Central—								
100 to 199	56	1	63	0	0	14	3	2
200 to 499	80	0	81	0	0	21	14	5
500 to 999	80	2	89	1	*	33	25	5
1,000 to 1,999	72	17	92	1	1	32	60	22
2,000 to 4,999	31	59	94	*	9	51	85	44
5,000 & over	9	65	86	19	19	49	87	39
All	70	3	77	*	*	22	17	6
Southeast—								
100 to 199	39	0	42	0	0	6	9	1
200 to 499	65	2	77	4	0	15	21	1
500 to 999	71	12	86	1	0	26	32	7
1,000 to 1,999	62	22	87	3	4	20	53	6
2,000 to 4,999	32	34	95	23	14	23	77	21
5,000 & over	12	49	75	12	3	52	75	37
All	52	4	62	2	1	12	19	3
Both regions, all sizes	68	3	76	1	*	21	17	6
<b>Feeder pig finishing:</b>								
North Central—								
100 to 199	74	0	74	0	0	14	31	0
200 to 499	64	0	73	0	0	14	15	3
500 to 999	61	4	85	0	2	10	9	0
1,000 to 1,999	51	13	68	0	3	29	50	12
2,000 to 4,999	54	5	72	4	0	11	69	4
5,000 & over	31	42	88	9	5	41	48	14
All	66	2	75	*	1	14	26	2

See footnotes at end of table.

Continued

Appendix table 35—Types of equipment used for feed processing and distribution, by type and size of hog enterprise and region, 1980—continued

Type and size of enterprise and region (head)	Mobile grinder-mixer <sup>1</sup>	Stationary grinder-mixer <sup>1</sup>	Any type of feed mill <sup>2</sup>	Feed mixer <sup>3</sup>	Premixer <sup>4</sup>	Self-unloading feed wagon or truck <sup>5</sup>	Feed conveying system <sup>6</sup>	Self-unloading wagon and conveying system
Percent of farms								
Southeast—								
100 to 199	41	0	41	0	0	6	6	0
200 to 499	58	1	61	0	0	3	7	2
500 to 999	56	15	78	0	4	3	39	0
1,000 to 1,999	34	30	69	3	8	17	54	8
2,000 to 4,999	28	28	69	8	4	4	51	4
5,000 & over	15	17	44	5	5	6	65	6
All	47	4	53	*	1	5	13	1
Both regions, all sizes	63	2	72	*	1	13	25	2
All regions, all sizes	57	3	64	*	*	18	19	6

\*Less than 0.5 percent.

<sup>1</sup>Mobile grinder-mixers are usually tractor powered, stationary grinder-mixers electrically powered.<sup>2</sup>The proportion of farmers who used one or more of any type of burr, hammer or roller mill either mobile or stationary, with or without the capacity to mix feeds.<sup>3</sup>Includes feed mixers that are separate from the feed mill.<sup>4</sup>Includes equipment separate from the feed mill for mixing small amounts of feed additives.<sup>5</sup>1 percent of the farmers with such equipment had units that both mixed and weighed feed; 2 percent had equipment that only mixed feeds; all others simply hauled and unloaded feeds.<sup>6</sup>Includes all types of feed-conveying systems that move feed via augers, belts, chain drag, and high-pressure air.

Source: 1981 survey.



Appendix table 36—Types of farrowing facilities, by type and size of hog enterprise and region, 1980<sup>1</sup>

Type and size of enterprise and region (head)	None	Portable only	Only central farrowing houses with:						Central and portable	Other
			Paved floors	Slotted floors	Flush system	Scrape system	Solid & slotted floor mix	Slotted, flush, scrape mix		
<i>Percent of pigs</i>										
<b>Feeder pig production:</b>										
North Central—										
100 to 199	39	61	0	0	0	0	0	0	0	0
200 to 499	5	0	15	0	0	45	0	0	0	0
500 to 999	2	14	25	13	3	16	0	0	14	13
1,000 to 1,999	0	13	11	37	12	0	0	0	8	19
2,000 to 4,999	1	1	41	23	0	0	0	2	32	0
5,000 & over	0	0	11	69	17	0	0	2	32	0
All	6	13	18	16	4	17	0	*	18	8
Southeast—										
100 to 199	11	0	66	1	0	0	0	0	0	22
200 to 499	2	0	53	7	13	9	0	0	10	6
500 to 999	33	0	53	12	0	0	0	0	2	0
1,000 to 1,999	2	0	42	43	10	0	0	0	3	0
2,000 to 4,999	0	0	29	30	33	6	3	0	0	0
5,000 & over	0	0	48	52	0	0	0	0	0	0
All	8	0	49	24	9	3	*	0	3	4
Both regions, all sizes	6	11	23	18	5	15	*	*	15	7
<b>Farrow-to-finish:</b>										
North Central—										
100 to 199	30	14	46	0	0	0	0	0	5	5
200 to 499	10	16	60	0	0	0	0	0	10	4
500 to 999	2	14	40	21	2	1	0	0	20	0
1,000 to 1,999	3	6	28	24	3	1	4	0	19	12
2,000 to 4,999	0	2	12	81	1	0	1	*	1	2
5,000 & over	3	0	5	51	19	5	7	5	5	0
All	7	10	38	23	2	1	2	*	12	5
Southeast—										
100 to 199	47	5	29	4	0	0	0	0	4	11
200 to 499	30	7	38	10	2	1	0	0	3	9
500 to 999	5	6	60	28	0	0	0	0	0	0
1,000 to 1,999	5	0	35	36	12	0	4	3	5	0
2,000 to 4,999	1	1	29	38	17	0	1	4	6	3
5,000 & over	0	3	17	55	12	3	4	3	0	3
All	16	4	35	27	7	1	1	2	3	4
Both regions, all sizes	8	10	37	24	3	1	1	*	11	2

\*Less than 0.5 percent.

<sup>1</sup>Farms with only central farrowing houses are divided according to the type of floor in the farrowing houses including houses with only one type of floor and those with mixed systems. The category of central and portable includes any kind of central housing plus portable housing. The last category includes mixtures of central housing not previously specified.

Appendix table 37—Type of flooring in central farrowing houses, by type and size of hog enterprise and region, 1980

Type and size of enterprise and region (head)	Paved	Partly slotted	Fully slotted	Flush gutter, open	Flush gutter, covered	Scrape gutter, open	Scrape gutter, covered	Dirt	Other
<i>Percent of capacity</i>									
Feeder pig production:									
North Central—	**	**	**	**	**	**	**	**	**
100 to 199									
200 to 499	61	0	0	0	0	32	0	0	7
500 to 999	32	14	13	4	0	23	0	0	14
1,000 to 1,999	17	33	7	0	24	0	0	0	19
2,000 to 4,999	37	24	37	2	0	0	0	0	0
5,000 & over	10	74	0	0	16	0	0	0	0
All	45	11	7	1	3	23	0	0	10
Southeast—									
100 to 199	86	0	2	0	0	0	0	12	0
200 to 499	53	7	0	8	0	21	0	11	0
500 to 999	76	19	5	0	0	0	0	0	0
1,000 to 1,999	52	19	18	11	0	0	0	0	0
2,000 to 4,999	48	9	15	1	24	3	0	0	0
5,000 & over	34	**	66	0	0	0	0	0	0
All	65	7	6	4	2	8	0	8	0
Both regions, all sizes	50	10	7	2	3	19	0	2	7
Farrow-to-finish:									
North Central—									
100 to 199	91	0	0	0	0	0	0	0	9
200 to 499	92	0	0	0	0	0	0	*	8
500 to 999	61	14	11	1	2	0	*	10	1
1,000 to 1,999	42	31	9	3	4	1	4	0	6
2,000 to 4,999	9	21	68	0	1	0	0	0	1
5,000 & over	8	18	45	3	23	*	3	0	0
All	68	10	11	1	2	*	1	2	5
Southeast—									
100 to 199	83	6	0	0	0	0	0	9	2
200 to 499	63	9	2	5	1	1	0	15	4
500 to 999	66	26	8	0	0	0	0	0	0
1,000 to 1,999	45	31	14	3	7	0	0	0	*
2,000 to 4,999	25	25	24	19	5	0	0	0	2
5,000 & over	18	29	32	5	12	0	4	0	0
All	59	17	9	4	3	*	*	6	2
Both regions, all sizes	67	11	11	1	2	*	1	2	5
All types, all regions	62	11	10	1	2	5	1	2	6

\*Less than 0.5 percent.

\*\*No central farrowing houses used.

**Appendix table 38—Period of construction of central farrowing houses, by type and size of hog enterprise and region, 1980<sup>1</sup>**

Type and size of enterprise and region (head)	Before 1950	1950-59	1960-69	1970-74	1975-79	1980
<i>Percent of capacity</i>						
Feeder pig production:						
North Central—						
100 to 199	0	0	0	0	0	0
200 to 499	14	0	13	32	40	0
500 to 999	6	15	1	6	66	6
1,000 to 1,999	13	0	0	12	75	0
2,000 to 4,999	2	0	22	22	52	2
5,000 & over	6	0	4	27	63	0
All	11	4	8	22	53	2
Southeast—						
100 to 199	5	0	68	1	17	9
200 to 499	4	0	32	19	45	0
500 to 999	0	0	63	0	37	0
1,000 to 1,999	0	0	11	14	75	0
2,000 to 4,999	0	3	1	16	71	9
5,000 & over	0	0	0	34	66	0
All	3	*	42	11	40	4
Both regions, all sizes	9	3	18	19	49	2
Farrow-to-finish:						
North Central—						
100 to 199	57	6	26	4	7	0
200 to 499	36	12	26	10	11	5
500 to 999	32	4	22	11	26	5
1,000 to 1,999	7	2	20	20	47	4
2,000 to 4,999	*	*	11	13	76	*
5,000 & over	0	0	12	19	58	11
All	30	7	22	11	26	4
Southeast—						
100 to 199	2	6	62	12	13	5
200 to 499	7	2	21	25	42	3
500 to 999	3	1	20	20	52	4
1,000 to 1,999	2	0	12	25	54	7
2,000 to 4,999	0	2	16	25	50	7
5,000 & over	0	0	15	29	43	13
All	3	3	30	21	38	5
Both regions, all sizes	27	6	24	12	27	4
All types, all regions	22	5	22	14	33	4

\*Less than 0.5 percent.

<sup>1</sup>Includes all types of central farrowing houses regardless of type of floor. Date of construction is defined as the year built or the year of last remodeling equivalent to one-third or more of the cost of new construction.

**Appendix table 39—Types of nursery facilities, by type and size of hog enterprise and region, 1980<sup>1</sup>**

Type and size of enterprise and region (head)	None	Paved floor only	Slotted floor only	Flush system only	Scrap system only	Mixed self-cleaning floors	Other
<i>Percent of pigs</i>							
<b>Feeder pig production:</b>							
<b>North Central—</b>							
100 to 199	100	0	0	0	0	0	0
200 to 499	24	22	54	0	0	0	0
500 to 999	66	16	13	0	1	0	4
1,000 to 1,999	19	7	74	0	0	0	0
2,000 to 4,999	31	25	42	0	2	0	0
5,000 & over	16	4	68	10	0	1	1
All	41	15	43	1	*	*	1
<b>Southeast—</b>							
100 to 199	76	13	2	0	0	0	0
200 to 499	60	7	27	0	0	0	6
500 to 999	67	27	6	0	0	0	0
1,000 to 1,999	19	32	48	1	0	0	0
2,000 to 4,999	39	17	21	23	0	0	0
5,000 & over	0	31	52	17	0	0	0
All	43	21	27	7	0	0	2
Both regions, all sizes	41	16	40	2	*	*	2
<b>Farrow-to-finish:</b>							
<b>North Central—</b>							
100 to 199	97	3	0	0	0	0	0
200 to 499	89	9	2	0	0	0	0
500 to 999	70	7	23	0	0	0	0
1,000 to 1,999	35	16	46	1	2	0	0
2,000 to 4,999	14	6	79	1	0	0	0
5,000 & over	16	2	65	7	5	5	0
All	60	9	29	1	1	*	*
<b>Southeast—</b>							
100 to 199	92	4	2	0	0	0	2
200 to 499	93	2	2	*	0	0	3
500 to 999	63	20	16	1	0	0	0
1,000 to 1,999	29	22	25	18	0	0	6
2,000 to 4,999	22	17	51	10	0	0	0
5,000 & over	9	10	61	13	1	4	2
All	56	12	23	6	*	1	2
Both regions, all sizes	60	9	29	1	*	*	1

\*Less than 0.5 percent.

<sup>1</sup>Farms with nursery facilities are divided according to the type of floor in the nursery buildings, including farms with nurseries with only one type of floor and those with mixed self-cleaning systems. The last category includes farms with nurseries with mixed floor types not previously specified.

**Appendix table 40—Period of construction of nursery buildings in use in 1980 by type of flooring<sup>1</sup>**

Type of flooring	Before 1950	1950-59	1960-69	1970-74	1975-1980
<i>Percent of capacity</i>					
Solid floor units	27	8	27	9	18 11
Slotted floor units	*	*	5	21	67 7
Flush or scrape floor units	1	0	0	2	74 23

\*Less than 0.5 percent.

<sup>1</sup>The time pattern of construction did not differ by type or size of enterprise or by region. Date of construction is defined as the year built or the year of last remodeling equivalent to one-third or more of the cost of new construction.

Appendix table 41—Types of housing for growing and finishing hogs, by type and size of hog enterprise and region, 1980<sup>1</sup>

Type and size of enterprise and region (head)	None	Open-front building	Fully enclosed building with no access to lots	Fully enclosed building with access to lot	Mixed <sup>2</sup>
<i>Percent of hogs</i>					
Farrow-to-finish:					
North Central—					
100 to 199	37	32	1	30	0
200 to 499	21	17	16	39	7
500 to 999	16	28	18	18	20
1,000 to 1,999	3	40	17	21	19
2,000 to 4,999	1	9	39	3	48
5,000 & over	0	11	71	1	17
All	14	24	21	23	18
Southeast—					
100 to 199	66	25	7	2	0
200 to 499	55	36	6	2	1
500 to 999	40	47	9	2	2
1,000 to 1,999	29	50	17	2	2
2,000 to 4,999	5	60	28	0	7
5,000 & over	3	28	54	1	14
All	35	41	18	2	4
Both regions, all sizes	16	26	21	21	16
Feeder pig finishing:					
North Central—					
100 to 199	11	22	7	37	23
200 to 499	0	59	5	34	2
500 to 999	14	23	6	27	30
1,000 to 1,999	0	22	19	8	51
2,000 to 4,999	1	23	17	1	58
5,000 & over	0	10	18	0	72
All	5	31	10	32	32
Southeast—					
100 to 199	38	30	0	32	0
200 to 499	34	52	8	6	0
500 to 999	35	41	10	6	8
1,000 to 1,999	3	54	23	4	16
2,000 to 4,999	5	43	35	7	10
5,000 & over	2	26	37	0	35
All	20	42	19	8	11
Both regions, all sizes	7	33	11	20	29

<sup>1</sup>Less than 0.5 percent.<sup>2</sup>Floors may be of any kind. Open-front buildings are commonly associated with open lots.<sup>3</sup>Hogs produced on farms with two or more types of housing.

**Appendix table 42—Capacities of housing for growing-finishing hogs, by type of housing and type and size of hog enterprise and region, 1980<sup>1</sup>**

Type and size of enterprise and region (head)	Open-front building	Fully enclosed building with no access to lots	Fully enclosed building with access to lots
<i>Percent of capacity</i>			
<b>Farrow-to-finish</b>			
North Central—			
100 to 199	62	2	36
200 to 499	32	26	42
500 to 999	53	19	28
1,000 to 1,999	51	28	21
2,000 to 4,999	20	65	15
5,000 & over	21	79	0
All	41	32	27
Southeast—			
100 to 199	100	0	0
200 to 499	84	16	0
500 to 999	80	17	3
1,000 to 1,999	64	34	2
2,000 to 4,999	61	39	0
5,000 & over	43	56	1
All	67	32	1
Both regions	42	32	26
<b>Feeder pig finishing:</b>			
North Central—			
100 to 199	32	41	27
200 to 499	45	7	48
500 to 999	28	29	43
1,000 to 1,999	46	27	27
2,000 to 4,999	36	53	11
5,000 & over	29	52	19
All	37	29	34
Southeast—			
100 to 199	100	0	0
200 to 499	62	23	15
500 to 999	52	40	8
1,000 to 1,999	44	47	9
2,000 to 4,999	43	51	6
5,000 & over	31	69	0
All	49	44	7
Both regions	38	31	31
All regions, all types	41	31	28

<sup>1</sup>Less than 0.5 percent.

<sup>2</sup>The distribution of housing capacity is presented without regard to type of floor.

Appendix table 43—Types of flooring in growing and finishing buildings, by size of hog enterprise and region, 1980<sup>1</sup>

Type and size of enterprise and region (head)	Paved floor	Slotted floor	Flush system	Scrape system	Solid and slotted, mixed	Slotted, flush, scrape, mixed	Dirt floor	Other
<i>Percent of hogs</i>								
Farrow-to-finish:								
North Central—								
100 to 199	84	0	0	0	8	0	8	*
200 to 499	77	9	2	0	1	0	9	2
500 to 999	71	19	2	*	*	0	4	4
1,000 to 1,999	49	36	1	3	6	0	5	*
2,000 to 4,999	10	44	*	0	9	37	0	0
5,000 & over	12	60	14	5	5	4	0	0
All	56	26	2	1	4	6	4	1
Southeast—								
100 to 199	71	3	0	0	0	0	21	5
200 to 499	56	13	7	2	0	0	20	2
500 to 999	44	33	27	2	2	0	2	0
1,000 to 1,999	66	21	11	0	1	0	0	1
2,000 to 4,999	39	40	17	0	1	1	0	2
5,000 & over	18	53	11	2	6	6	4	0
All	46	32	12	1	1	1	6	1
Both regions, all sizes	54	25	4	1	4	6	5	1
Feeder pig finishing:								
North Central—								
100 to 199	71	0	0	0	26	0	0	3
200 to 499	61	8	0	0	0	0	26	5
500 to 999	63	15	0	0	17	0	*	5
1,000 to 1,999	42	24	0	0	21	5	*	8
2,000 to 4,999	20	22	3	0	32	10	9	4
5,000 & over	10	22	0	0	64	4	0	0
All	51	15	*	0	19	2	8	5
Southeast—								
100 to 199	87	0	0	0	0	0	0	13
200 to 499	65	8	4	0	0	0	23	0
500 to 999	44	23	0	0	10	0	23	0
1,000 to 1,999	38	26	18	0	8	0	0	10
2,000 to 4,999	44	29	12	0	2	3	0	10
5,000 & over	30	13	17	0	16	2	0	22
All	48	18	10	0	6	1	7	10
Both regions, all sizes	51	15	1	0	18	2	0	5

<sup>1</sup>Less than 0.5 percent.

<sup>2</sup>Data are for all types of housing combined, but separated according to types of floors. Includes only hogs produced on farms with some type of permanent housing. Hogs were finished on farms with buildings with one of the specified types of flooring or mixes of types of flooring. Slotted floors are constructed over pit storage for manure and may cover part or all of the floor space. Flush and scrape systems are designed to remove manure by flushing or mechanically scraping of the floors. The last column includes combinations of floor types not specified.

**Appendix table 44—Proportion of the capacity of housing for growing-finishing hogs provided by buildings with selected types of flooring, by type and size of hog enterprise, and region, 1980<sup>1</sup>**

Type and size of enterprise and region (head)	Paved floor	Partly slotted	Fully slotted	Flush gutter, open	Flush gutter, covered	Scrape gutter, open	Scrape gutter, covered	Dirt	Other
<i>Percent of capacity</i>									
<b>Farrow-to-finish:</b>									
North Central—									
100 to 199	88	5	0	0	0	0	0	7	0
200 to 499	74	2	13	0	0	0	0	7	4
500 to 999	79	12	4	0	0	1	1	3	0
1,000 to 1,999	46	42	10	1	*	*	1	0	0
2,000 to 4,999	15	15	60	0	*	0	10	0	0
5,000 & over	8	17	55	1	11	0	8	0	0
All	58	16	19	*	1	*	2	3	1
Southeast—									
100 to 199	22	0	53	0	0	0	0	25	0
200 to 499	63	6	4	6	2	3	0	16	0
500 to 999	57	23	4	9	5	2	0	0	0
1,000 to 1,999	64	7	17	12	0	0	0	0	0
2,000 to 4,999	35	17	29	17	2	0	0	0	0
5,000 & over	27	20	37	12	2	0	1	1	0
All	48	15	19	11	2	1	*	4	0
Both regions	57	16	19	1	1	*	2	3	1
<b>Feeder pig finishing:</b>									
North Central—									
100 to 199	62	33	0	0	0	0	0	0	5
200 to 499	70	16	4	0	0	0	0	10	0
500 to 999	70	20	10	0	0	0	0	0	0
1,000 to 1,999	54	28	12	1	5	0	0	*	0
2,000 to 4,999	36	27	26	8	0	0	0	2	1
5,000 & over	45	10	45	0	0	0	0	0	0
All	62	24	8	1	1	0	0	3	1
Southeast—									
199 to 199	100	0	0	0	0	0	0	0	0
200 to 499	38	0	0	0	6	0	0	56	0
500 to 999	55	12	33	0	0	0	0	0	0
1,000 to 1,999	57	30	0	4	9	0	0	*	0
2,000 to 4,999	47	9	23	4	17	0	0	0	0
5,000 & over	35	7	28	17	7	0	0	6	0
All	50	12	15	5	8	0	0	10	0
Both regions	61	24	9	1	1	0	0	3	1
All regions, all types	58	18	16	1	1	*	2	3	1

\*Less than 0.5 percent.

<sup>1</sup>Data are for all types of housing combined, but separated according to floor types. Flush and scrape systems include gutters to carry the wastes. Gutters may be covered with a slotted floor or otherwise designed to exclude hogs or left open.



Appendix table 45—Period of construction of growing and finishing of buildings, by type and size of hog enterprise and region, 1980<sup>1</sup>

Type and size of enterprise and region (head)	Before 1950	1950-59	1960-69	1970-74	1975-79	1980
<i>Percent of capacity</i>						
Farrow-to-finish:						
North Central—						
100 to 199	47	4	18	*	28	2
200 to 499	28	15	32	20	5	0
500 to 999	23	6	30	8	26	7
1,000 to 1,999	10	5	13	29	40	3
2,000 to 4,999	*	4	48	7	40	1
5,000 & over	*	3	13	25	57	2
All	19	8	28	16	27	2
Southeast—						
100 to 199	8	0	0	53	27	12
200 to 499	5	0	19	31	43	2
500 to 999	1	2	24	12	56	5
1,000 to 1,999	5	0	9	33	50	3
2,000 to 4,999	2	1	21	16	51	9
5,000 & over	0	0	9	42	45	4
All	3	*	17	27	48	5
Both regions, all sizes	18	7	27	16	29	3
Feeder pig finishing:						
North Central—						
100 to 199	29	22	3	8	0	38
200 to 499	39	6	4	4	47	0
500 to 999	27	6	20	10	35	2
1,000 to 1,999	16	1	23	20	35	5
2,000 to 4,999	12	7	5	39	32	5
5,000 & over	9	0	26	9	54	2
All	26	10	11	12	28	13
Southeast—						
100 to 199	9	0	26	9	54	2
200 to 499	15	0	0	79	6	0
500 to 999	22	0	3	5	55	15
1,000 to 1,999	3	0	12	29	34	22
2,000 to 4,999	0	0	8	20	60	12
5,000 & over	0	7	14	5	74	0
All	6	1	8	27	49	9
Both regions, all sizes	25	9	11	13	29	13
All types, all regions	20	8	22	15	29	6

\*Less than 0.5 percent

<sup>1</sup>Includes all housing for the growing and finishing of hogs regardless of type of building or floor. Date of construction is defined as the year built or the year of last remodeling equivalent to one-third or more of the cost of new construction.

Appendix table 46—Use of paved lots in hog enterprises, by type and size of hog enterprise and region, 1980<sup>1</sup>

Size of enterprise and region (head)	Feeder pig production	Farrow-to- finish	Feeder pig finishing	Feeder pig production	Farrow-to- finish	Feeder pig finishing
	-----Percent of farms-----			-----Square feet of lot/head of sales <sup>2</sup> -----		
North Central:						
100 to 199	32	53	45	16	13	16
200 to 499	87	61	61	7	12	8
500 to 999	44	75	58	20	9	6
1,000 to 1,999	42	64	67	2	5	5
2,000 to 4,999	35	67	49	2	14	5
5,000 & over	7	37	44	1	3	4
All	57	61	55	9	10	7
Southeast:						
100 to 199	0	10	0	0	9	0
200 to 499	3	2	3	1	7	9
500 to 999	5	4	17	3	1	4
1,000 to 1,999	0	3	13	0	2	2
2,000 to 4,999	7	6	8	1	2	6
5,000 & over	31	3	12	*	5	2
All	2	6	4	*	5	4

\* Less than 0.5 percent.

<sup>1</sup>Paved lots include only unsheltered areas. Paved floors inside of buildings are considered to be part of the building regardless of the type of building.

<sup>2</sup>Amount of paved lot per head of sales is based only on farms that used some paved lot.

**Appendix table 47—Use of special facilities in hog production, by type and size of hog enterprise and region, 1980**

Type and size of enterprise and region (head)	Generator for electricity	Livestock trailer <sup>1</sup>	Livestock or truck scales <sup>2</sup>	High-pressure sprayer	Three-phase electrical service	Steam cleaner
<i>Percent of farms</i>						
<b>Feeder pig production:</b>						
North Central—						
100 to 199	0	100	0	31	0	0
200 to 499	26	46	14	78	0	0
500 to 999	7	14	10	40	5	3
1,000 to 1,999	36	51	10	75	21	1
2,000 to 4,999	71	51	15	80	8	18
5,000 & over	98	32	48	94	42	14
All	16	59	9	56	3	1
Southeast—						
100 to 199	0	12	4	0	0	0
200 to 499	4	40	7	23	3	2
500 to 999	5	44	32	21	1	0
1,000 to 1,999	4	40	9	42	15	5
2,000 to 4,999	11	69	25	34	39	6
5,000 & over	38	62	69	69	31	0
All	2	27	9	13	3	1
Both regions, all sizes	14	54	9	48	3	1
<b>Farrow-to-finish:</b>						
North Central—						
100 to 199	13	30	7	21	2	0
200 to 499	26	32	2	36	7	7
500 to 999	41	38	15	52	10	4
1,000 to 1,999	52	67	17	83	6	0
2,000 to 4,999	90	73	48	92	45	6
5,000 & over	75	59	58	98	58	5
All	27	36	8	38	7	4
Southeast—						
100 to 199	1	49	6	8	3	1
200 to 499	1	59	7	10	6	3
500 to 999	9	68	9	31	14	8
1,000 to 1,999	18	71	19	48	13	18
2,000 to 4,999	45	82	49	67	42	39
5,000 & over	50	77	35	74	54	34
All	4	56	9	15	7	4
Both regions, all sizes	25	38	8	35	7	4
<b>Feeder pig finishing:</b>						
North Central—						
100 to 199	22	26	0	22	0	19
200 to 499	11	26	16	32	12	8
500 to 999	36	30	11	51	30	16
1,000 to 1,999	50	49	18	63	19	*
2,000 to 4,999	60	44	13	76	6	3
5,000 & over	80	77	56	90	16	43
All	23	29	10	35	12	13
Southeast—						
100 to 199	0	55	0	6	0	0
200 to 499	0	52	2	3	8	4
500 to 999	2	56	4	19	11	3
1,000 to 1,999	10	58	28	33	20	13
2,000 to 4,999	17	50	36	44	24	7
5,000 & over	22	45	34	61	41	10
All	1	54	3	9	5	3
Both regions, all sizes	20	33	9	32	11	11
All types, all regions	21	40	8	37	7	5

\*Less than 0.5 percent.

<sup>1</sup>Includes trailers for hauling livestock pulled by farm tractors or small trucks.

<sup>2</sup>Includes scales large enough to weigh trucks or groups of hogs.

Appendix table 48—Use and type of bedding in hog enterprises, by type of hog enterprise and region, 1980

Enterprise and region	All bedding materials <sup>1</sup>		Straw <sup>2</sup>		Wood products <sup>3</sup>		Other <sup>2</sup>	
	Farmers buying	Part bought	Farmers buying	Price per ton	Farmers buying	Price per ton	Farmers buying	Price per ton
	----- Percent -----			Dol/ton	Percent	Dol/ton	Percent	Dol/ton
Feeder pig production:								
North Central	18	80	93	49	5	93	2	25
Southeast	43	99	78	51	21	8	1	137
Farrow-to-finish:								
North Central	19	83	96	38	4	40	1	58
Southeast	29	94	60	37	34	17	6	48
Feeder pig finishing:								
North Central	11	84	99	39	1	11	0	0
Southeast	16	100	2	62	2	15	96	50
All types, and regions	19	85	90	41	7	31	3	51

<sup>1</sup>Farmers buying any kind of bedding materials are expressed as a percentage of those using bedding in their hog operations. The part bought is expressed as a percentage of their total use.

<sup>2</sup>Farmers buying specified kinds of bedding materials are expressed as a percentage of those buying bedding materials of any kind.

Appendix table 49—Waste handling on hog farms, by form of waste, type and size of hog enterprise and region, 1980

Type and size of enterprise and region (head)	Form of waste			
	Not handled	Solid form	Liquid form	Both solid and liquid forms
<i>Percent of farms</i>				
<b>Feeder pig production:</b>				
North Central—				
100 to 199	0	100	0	0
200 to 499	0	36	1	63
500 to 999	0	70	5	25
1,000 to 1,999	0	7	10	83
2,000 to 4,999	1	22	22	55
5,000 & over	0	0	91	9
All	*	38	2	37
Southeast—				
100 to 199	14	81	0	5
200 to 499	17	68	11	4
500 to 999	36	39	18	7
1,000 to 1,999	8	21	50	21
2,000 to 4,999	10	12	53	25
5,000 & over	0	0	69	31
All	17	68	9	6
<b>Farrow-to-finish:</b>				
North Central—				
100 to 199	1	99	0	0
200 to 499	1	90	1	8
500 to 999	1	65	7	27
1,000 to 1,999	0	33	15	52
2,000 to 4,999	0	9	27	64
5,000 & over	0	3	52	45
All	1	83	3	13
Southeast—				
100 to 199	72	23	3	2
200 to 499	49	27	17	7
500 to 999	28	22	38	12
1,000 to 1,999	21	14	44	21
2,000 to 4,999	12	3	68	17
5,000 & over	1	2	75	22
All	56	23	15	6

See footnotes at end of table.

Continued

Appendix table 49—Waste handling on hog farms, by form of waste, type and size of hog enterprise and region, 1980—Continued

Type and size of enterprise and region (head)	Form of waste			
	Not handled	Solid form	Liquid form	Both solid and liquid forms
<i>Percent of farms</i>				
<b>Feeder pig finishing:</b>				
North Central—				
100 to 199	0	81	19	0
200 to 499	12	71	15	2
500 to 999	1	59	7	33
1,000 to 1,999	*	39	34	27
2,000 to 4,999	0	19	24	57
5,000 & over	0	5	27	68
All	5	69	16	10
Southeast—				
100 to 199	43	40	6	11
200 to 499	83	10	4	3
500 to 999	53	15	24	8
1,000 to 1,999	9	9	73	9
2,000 to 4,999	20	6	67	7
5,000 & over	20	7	51	22
All	55	25	12	8

\*Less than 0.5 percent.

Appendix table 50—Period of manufacture of manure-handling equipment on farms with hog enterprises, 1980<sup>1</sup>

Type of equipment	Before 1960	1960-69	1970-74	1975-79	1980
<i>Percent of equipment</i>					
Solid manure equipment <sup>2</sup>	17	21	25	33	4
Liquid manure equipment <sup>3</sup>	1	12	23	60	4
Barn floor flushing equipment <sup>4</sup>	0	2	9	75	14
Liquid manure irrigation equipment <sup>5</sup>	0	3	8	81	8

<sup>1</sup>Items of equipment are given equal weight without regard to size or values in determining the age distribution. Both solid and liquid manure handling equipment were in widespread use; equipment for flushing of barn floors and irrigation with liquid manure was used on only a small portion of all farms.

<sup>2</sup>Includes tractor-mounted front-end loaders, self-propelled skid loaders, tractor scrapers, and all types of solid manure spreaders.

<sup>3</sup>Includes all types of liquid manure spreaders with or without attachments for soil injection.

<sup>4</sup>Includes the tanks and pumps for flushing manure from buildings with guttered floors.

<sup>5</sup>All components of an irrigation system are considered as a unit.

**Appendix table 51—Type of storage for liquid manure on farms with hog enterprises, by type and size of hog enterprise and region, 1980**

Type and size of enterprise and region (head)	Pit below building	Pit outside building	Slurry tank <sup>1</sup>	All types <sup>2</sup>	Liquid manure storage capacity <sup>3</sup>
	-----Percent of farms-----				Gal/100 head of sales
<b>Feeder pig production:</b>					
North Central—					
100 to 199	0	0	0	0	0
200 to 499	26	41	0	67	2,614
500 to 999	15	4	0	15	6,490
1,000 to 1,999	72	19	0	91	4,564
2,000 to 4,999	30	29	0	56	5,696
5,000 & over	58	21	0	58	5,793
All	19	19	0	37	4,208
Southeast—					
100 to 199	1	0	0	1	33,808
200 to 499	17	27	0	27	5,346
500 to 999	4	0	0	4	14,816
1,000 to 1,999	35	0	0	35	7,122
2,000 to 4,999	33	3	2	33	1,722
5,000 & over	38	0	0	38	8,364
All	9	9	*	13	6,533
Both regions and types	17	17	*	33	4,457
<b>Farrow-to-finish:</b>					
North Central—					
100 to 199	0	1	0	1	6,800
200 to 499	7	4	0	10	10,117
500 to 999	25	5	2	30	10,111
1,000 to 1,999	51	20	2	64	9,029
2,000 to 4,999	79	11	*	84	8,699
5,000 & over	69	12	7	74	12,754
All	12	5	1	16	9,623
Southeast—					
100 to 199	2	1	1	4	1,738
200 to 499	5	1	0	5	13,142
500 to 999	20	3	0	22	5,904
1,000 to 1,999	24	4	2	2	5,857
2,000 to 4,999	45	12	0	47	7,883
5,000 & over	41	5	0	43	9,749
All	7	2	1	8	7,840
Both regions and types	2	4	1	15	9,498
<b>Feeder pig finishing:</b>					
North Central—					
100 to 199	19	0	0	19	32,211
200 to 499	8	5	0	13	15,193
500 to 999	28	19	0	45	5,660
1,000 to 1,999	50	15	5	3	8,113
2,000 to 4,999	70	12	1	75	5,503
5,000 & over	84	22	0	84	6,408
All	20	7	*	26	8,807
Southeast—					
100 to 199	0	0	0	0	0
200 to 499	0	0	0	0	0
500 to 999	11	0	0	11	12,711
1,000 to 1,999	24	5	0	28	4,997
2,000 to 4,999	32	4	2	36	7,698
5,000 & over	13	0	0	13	2,338
All	3	*	*	3	6,728
Both regions and types	17	6	*	22	8,714
All types, all regions	14	7	*	1	8,040

\*Less than 0.5 percent.

<sup>1</sup>An above-ground steel or concrete storage tank.

<sup>2</sup>Percent of farms with any type of storage for liquid manure, excluding lagoons.

<sup>3</sup>Based only on farms that had storage for liquid manure from hogs.

**Appendix table 52—Type and size of pollution control facilities on farms with hog enterprises, by type and size of hog enterprise and region, 1980**

Type and size of enterprise and region (head)	Diversion terrace		Lagoon		Settling basin		Vegetative filter	
	Farms	Average size <sup>1</sup>	Farms	Average size <sup>1,2</sup>	Farms	Average size <sup>1</sup>	Farms	Average size <sup>1</sup>
	Percent	Linear feet	Percent	Acres	Percent	Square feet	Percent	Acres
<b>Feeder pig production:</b>								
North Central—								
100 to 199	0	0	0	0	0	0	0	0
200 to 499	0	0	0	0	0	0	0	0
500 to 999	4	96	0	0	0	0	0	0
1,000 to 1,999	0	0	11	.1	0	0	0	0
2,000 to 4,999	0	0	4	.1	0	0	0	0
5,000 & over	0	0	79	**	1	48	0	0
All	1	96	1	**	*	48	0	0
Southeast—								
100 to 199	0	0	11	1.2	0	0	0	0
200 to 499	0	0	10	.8	0	0	0	0
500 to 999	0	0	42	.1	0	0	5	1.5
1,000 to 1,999	4	15	78	.1	0	0	0	0
2,000 to 4,999	23	23	90	**	2	85	0	0
5,000 & over	31	1	100	**	31	12	0	0
All	1	9	19	.1	*	16	1	1.5
<b>Farrow-to-finish:</b>								
North Central—								
100 to 199	0	0	0	0	0	0	0	3.8
200 to 499	0	0	1	.3	2	3,268	0	0
500 to 999	0	0	5	.1	3	210	2	.2
1,000 to 1,999	2	25	6	.1	4	66	1	.1
2,000 to 4,999	0	0	14	.1	5	623	0	0
5,000 & over	0	0	66	**	11	184	4	**
All	*	25	2	.1	2	709	1	.4
Southeast—								
100 to 199	0	0	8	1.2	0	0	0	0
200 to 499	0	0	27	.3	0	0	0	0
500 to 999	1	55	1	.2	2	17	0	0
1,000 to 1,999	3	34	68	.1	2	100	0	0
2,000 to 4,999	11	39	88	.1	7	10	2	.1
5,000 & over	30	19	93	.1	3	24	0	0
All	1	26	23	.2	*	26	*	.1
<b>Feeder pig finishing:</b>								
North Central—								
100 to 199	0	0	0	0	0	0	0	0
200 to 499	0	0	6	.4	0	0	0	0
500 to 999	0	0	3	.2	0	0	0	0
1,000 to 1,999	0	0	9	.1	*	28	0	0
2,000 to 4,999	4	53	7	**	1	44	0	0
5,000 & over	10	18	43	**	24	12	5	.1
All	*	36	4	.1	*	17	*	.1
Southeast—								
100 to 199	0	0	17	.8	0	0	0	0
200 to 499	6	142	27	.5	0	0	0	0
500 to 999	6	1,044	37	.2	3	20	0	0
1,000 to 1,999	1	30	71	.1	0	0	0	0
2,000 to 4,999	4	17	73	.1	0	0	0	0
5,000 & over	14	12	82	**	0	0	0	0
All	3	213	26	.1	*	20	0	0

\*Less than 0.5 percent.

\*\*Less than 0.05 acre.

<sup>1</sup>Average size is based on the size of the facility divided by the hundreds of hogs and pigs sold by the farm using the facility in 1980.

<sup>2</sup>Measured in surface acres per 100 head of sales.

**Appendix table 53—Types of markets used by feeder pig producers to sell pigs and by feeder pig finishers to acquire pigs by size of hog enterprise and region, 1980<sup>1</sup>**

Type and size of enterprise (head)	North Central			Southeast		
	1 market	2 markets	3 or more markets	1 market	2 markets	3 or more markets
<i>Percent of farms</i>						
Feeder pig production:						
100 to 199	100	0	0	97	3	0
200 to 499	55	45	0	100	0	0
500 to 999	74	26	0	98	2	0
1,000 to 1,999	66	27	7	88	12	0
2,000 to 4,999	74	26	0	88	12	0
5,000 & over	79	21	0	69	31	0
Feeder pig finishing:						
100 to 199	93	7	0	83	17	0
200 to 499	79	19	2	66	34	0
500 to 999	56	39	5	71	29	0
1,000 to 1,999	52	37	11	75	25	0
2,000 to 4,999	72	20	8	69	26	5
5,000 & over	45	17	38	56	44	0

<sup>1</sup>Markets for feeder pigs were considered only for producers who specialized in the production of pigs for sale as feeders; sources of feeder pigs only for producers who specialized in acquiring them for finishing.

**Appendix table 54—Types of markets used by producers to sell slaughter hogs, by type and size of hog enterprise and region, 1980<sup>1</sup>**

Type and size of enterprise (head)	North Central			Southeast		
	1 market	2 markets	3 or more markets	1 market	2 markets	3 or more markets
<i>Percent of farms</i>						
Farrow-to-finish:						
100 to 199	94	5	1	92	9	0
200 to 499	95	5	0	91	9	0
500 to 999	86	13	1	92	8	0
1,000 to 1,999	88	10	2	92	8	0
2,000 to 4,999	95	5	0	94	6	0
5,000 & over	80	20	0	94	6	0
Feeder pig finishing:						
100 to 199	100	0	0	100	0	0
200 to 499	89	11	0	98	2	0
500 to 999	91	5	4	84	16	0
1,000 to 1,999	87	13	0	82	18	0
2,000 to 4,999	86	13	1	92	6	2
5,000 & over	69	21	10	100	0	0

<sup>1</sup>Markets for slaughter hogs were considered only for barrows and gilts sold by producers who specialized in farrow-to-finish production or feeder pig finishing. Markets for cull breeding stock are not included in these data.



- **Recession**
- **Falling land values**
- **Rising debt loads**

These are some of the problems which have buffeted the Nation's farms for the past few years. How have farmers adapted? **U.S. Farming in the Early 1980's: Production and Financial Structure** profiles the contemporary U.S. farm sector and outlines how it is expected to fare in the near future.

With the 50-year exodus from farming finally near an end, farms are now larger than ever. Many are more profitable than ever, while others are vulnerable to just 1 or 2 bad years. Ever higher capital requirements, debt and credit price instability, and declining worth of farm real estate have created opportunities for some farmers while forcing others to abandon their farm endeavors.

What does it all mean for tomorrow's farms? To find out, send for your copy of **U.S. Farming in the Early 1980's: Production and Financial Structure**. To order your copy, write to:

**Superintendent of Documents  
U.S. Government Printing Office  
Washington, D.C. 20402**

Paper copies are priced at \$4.25 each. Make your checks or money order payable to **Superintendent of Documents**. For faster service, call (202) 783-3238 and charge your purchase to your VISA, MasterCard, or GPO deposit account.

## ***If Your Business is Oils... You Need These Reports***

**Statistics on Oilseeds and Related Data, 1965-82** (\$5.00; 72 pages; SB-695). USDA's latest annual estimates on production, stocks, disposition, exports, imports, and prices. We've done the legwork for you by culling these statistics from diverse sources and putting them in a convenient one-volume format. The numbers represent the most accurate assessments of Government and private sources, including the Departments of Agriculture and Commerce, the Institute of Shortening, the Chemical Marketing Reporter, and the National Provisioner Report.

More than 100 tables give you the breakdown for cottonseed, flaxseed, linseed, peanuts, soybeans, sunflowers, and edible fats and oils.

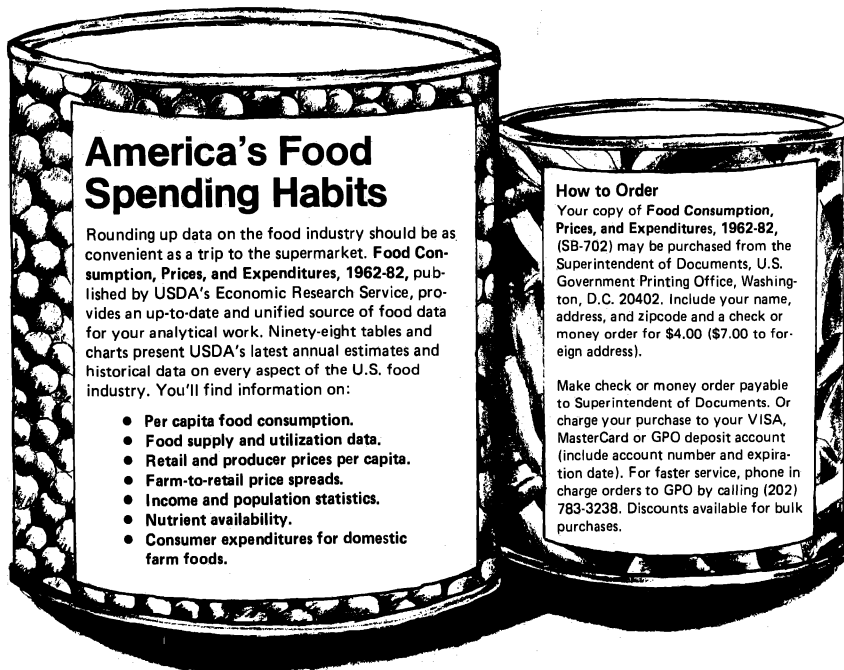
**U.S. Peanut Industry** (\$4.75; 52 pages; AER-493). A comprehensive picture of the last three decades of peanut production, consumption, and world trade. The United States accounts for about 10 percent of world exports of peanut oil and is the third largest producer of peanuts (behind

India and China). With 10 figures and more than 30 tables, the report tells you:

- Major markets for peanut exports.
- Primary uses for different peanut varieties.
- Causes of yield increases over the last 30 years.
- Major production and marketing practices.
- Effects of Government programs on peanut farmers.

### **To Order These Reports . . .**

Write to **Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402**. Make your check or money order payable to **Superintendent of Documents**. You can charge your order on VISA, MasterCard, or with a GPO deposit account; call GPO's order desk at (202) 783-3238. No additional charges for postage to domestic addresses; but foreign addresses, please add 25 percent extra. Bulk discounts available.



## America's Food Spending Habits

Rounding up data on the food industry should be as convenient as a trip to the supermarket. **Food Consumption, Prices, and Expenditures, 1962-82**, published by USDA's Economic Research Service, provides an up-to-date and unified source of food data for your analytical work. Ninety-eight tables and charts present USDA's latest annual estimates and historical data on every aspect of the U.S. food industry. You'll find information on:

- Per capita food consumption.
- Food supply and utilization data.
- Retail and producer prices per capita.
- Farm-to-retail price spreads.
- Income and population statistics.
- Nutrient availability.
- Consumer expenditures for domestic farm foods.

### How to Order

Your copy of **Food Consumption, Prices, and Expenditures, 1962-82**, (SB-702) may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Include your name, address, and zipcode and a check or money order for \$4.00 (\$7.00 to foreign address).

Make check or money order payable to Superintendent of Documents. Or charge your purchase to your VISA, MasterCard or GPO deposit account (include account number and expiration date). For faster service, phone in charge orders to GPO by calling (202) 783-3238. Discounts available for bulk purchases.

## Solar Power: Success and Uncertainty

Solar energy's modest foothold on U.S. farms faces an uncertain future, even though its applications to date have been fairly successful.

*Progress of Solar Technologies and Potential Farm Uses* explores the advances and problems in developing solar applications on the farm. Many low-cost homemade solar collectors, with multiple uses and a payback of

less than 5 years, are currently being used on farms.

But solar's future role in agriculture will depend on energy prices of alternative energy sources (such as nuclear and hydroelectric power) and on the competitiveness of redesigned conventional power systems.

In addition, the solar industry, which to date has not focused on farm needs, has to show more interest in marketing low-cost systems specifically developed for agriculture.

The report highlights the advantages and drawbacks for the following solar farm applications:

- Solar-heated farrowing and nursery barns
- Solar-heated water for dairies
- Solar-heated houses for brooding broilers
- Solar-heated greenhouses

*Progress of Solar Technologies and Potential Farm Uses* (by Walter G. Heid, Jr., and Warren K. Trotter; AER-489; September 1982; 112 pages; \$5). Available from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Make your check or money order payable to Superintendent of Documents. For faster service, call GPO's order desk at (202) 783-3238 and charge your purchase to your VISA, MasterCard, or GPO Deposit account. Bulk discounts available.

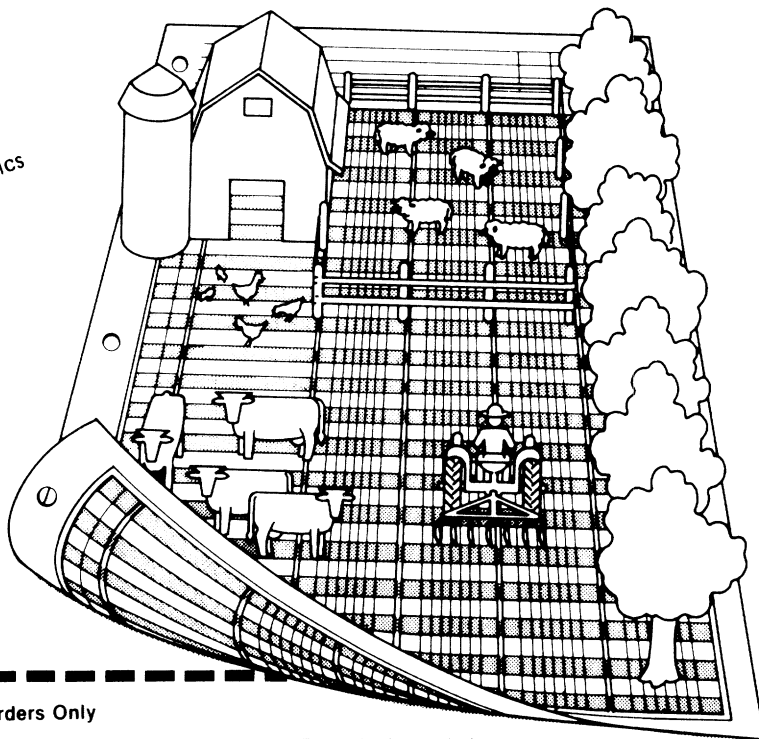
# Economic Indicators of the Farm Sector series

Keep tabs on farm income and expenses with the *Economic Indicators of the Farm Sector* series.

This series of five separate reports, offered now on a subscription basis, explores the economic status of U.S. farms to give you a comprehensive update on where U.S. agriculture is headed.

Here are the titles you will be receiving:

Income and Balance Sheet Statistics  
State Income and Balance Sheet Statistics  
Farm Sector Review  
Production and Efficiency Statistics  
Costs of Production



## Economic Indicators of the Farm Sector Order Form

Enclosed is \$ \_\_\_\_\_ ☐ check.

☐ money order, or charge to my  
Deposit Account No.

\_\_\_\_\_-\_\_\_\_

Order No. \_\_\_\_\_

### Mail to:

**Superintendent of Documents  
U.S. Government Printing Office  
Washington, D.C. 20402**

#### For Office Use Only

Quantity \_\_\_\_\_ Charges \_\_\_\_\_

\_\_\_\_\_ Enclosed \_\_\_\_\_

\_\_\_\_\_ To be mailed \_\_\_\_\_

\_\_\_\_\_ Subscriptions \_\_\_\_\_

Postage \_\_\_\_\_

Foreign handling \_\_\_\_\_

MMOB \_\_\_\_\_

OPNR \_\_\_\_\_

\_\_\_\_\_ UPNS \_\_\_\_\_

\_\_\_\_\_ Discount \_\_\_\_\_

\_\_\_\_\_ Refund \_\_\_\_\_

### Credit Card Orders Only



Total charges \$ \_\_\_\_\_ Fill in the boxes below

Credit  
Card No. \_\_\_\_\_



Expiration Date  
Month/Year \_\_\_\_\_

Please enter my subscription to **Economic Indicators of the Farm Sector (ECIFS)**  
for one year at \$15.00 Domestic; \$18.75 Foreign.

Name—First Last									
Company name or additional address line									
Street address									
City					State		ZIP Code		
(or Country)									

**PLEASE PRINT OR TYPE**

Make checks payable to: Superintendent of Documents.

**United States  
Department of Agriculture**

Washington, D.C.  
20250

OFFICIAL BUSINESS  
Penalty for Private Use, \$300



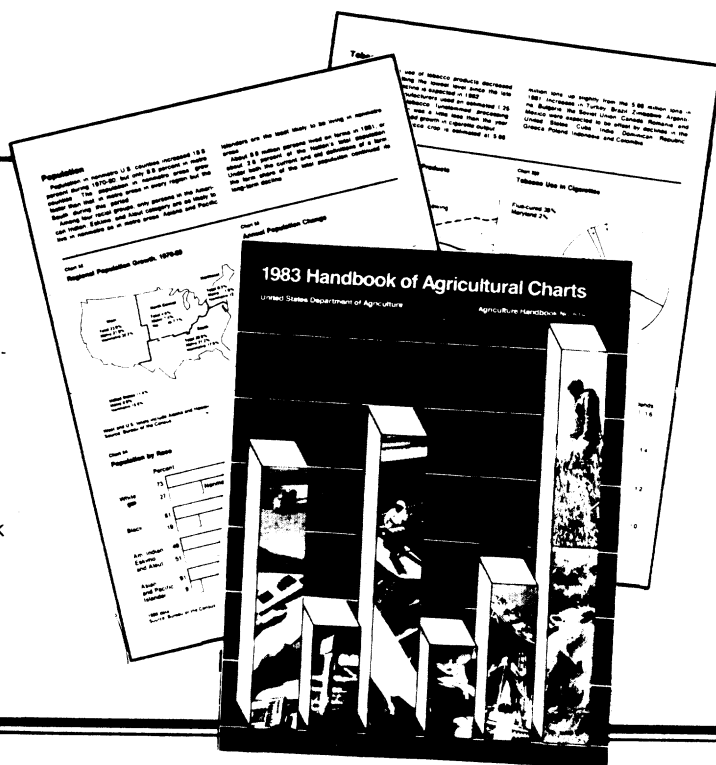
Postage and Fees Paid  
U.S. Department of Agriculture  
AGR-101



**THIRD CLASS BULK RATE**

## The 1983 Handbook of Agricultural Charts

Economic and agricultural trends come alive in this two-color handbook, containing 278 charts depicting all significant aspects of agriculture. To order your copy, send your check for \$5.00 payable to Superintendent of Documents, and mail to Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Be sure to indicate complete title and stock number. AH-619. Order SN: 001-000-04377-3 from GPO. \$5.00.



# AGRICULTURAL OUTLOOK

*Tracking the Business of Agriculture...*

**Agricultural Outlook** pools USDA's latest analyses of the agricultural economy in one comprehensive monthly package. Besides its regular outlook coverage—including commodity supply and demand, world agriculture and trade, food and marketing, farm inputs, agricultural policy, transportation and storage, and related developments in the general economy—**Agricultural**

**Outlook** is USDA's official outlet for farm income and food price forecasts. While emphasizing short-term outlook information, the magazine also publishes special reports containing long-term analyses of topics ranging from international trade policies to U.S. land use and availability. **Agricultural Outlook** averages 48 pages and includes 6 pages of updated charts and 20 pages of statistical tables.



**Annual subscription:** \$31.00 U.S., \$38.50 foreign. A 25-percent discount is offered on orders of 100 copies or more to one address. Order from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Make check payable to Superintendent of Documents. Allow 6 to 8 weeks for delivery.